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Reports
Porwoll, T.

1997 EPA Synoptic Survey
Wind River Mountains

Bridger-Teton National Forest
June, 1998

Report Compiled By:
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1997 EPA Synoptic Survey
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INTRODUCTION

During the 1997 summer field season the Bridger-Teton National Forest conducted a synoptic survey of Wind River lakes.

Through an Inter-Agency agreement, (DW 12953754-01-0), between EPA and the Forest Service, Bridger-Teton National Forest received $20,000 to sample numerous lakes in the Wind River Mountain Range in west central Wyoming.

The purpose of this synoptic survey was to conduct initial inventories of a large number of lakes to determine their general chemical characteristics. Several extremely sensitive lakes were identified and additional sampling will probably take place at these locations in the future.

METHODS

Prior to the beginning of the field season several drainages were selected for sampling. Criteria used for this selection included; bedrock geology, drainage size, lake size, elevation, and isolation from other sampled lakes.

Between July 30, 1997 and October 9, 1997 66 samples were taken from 55 lakes in the Wind River Range. The sampled lakes ranged from 9925 feet to 11684 feet in elevation and were distributed over nearly the entire length of the range, north to south.

The sampling crew consisted of two temporary Hydrologic Technicians, assisted and supervised by a permanent Hydrologic Technician from the Pinedale Ranger District. The crew began sampling in late July when most lakes were free of ice and the snowpack at higher elevations was conducive to travel. All of the lakes which were sampled were within congressionally designated Wilderness Areas and required that non-mechanized modes of transport be used.

The crew worked 8 to 10 hour days on 8 to 9 day tours. Most of the time spent on these tours was involved with travel. The remoteness of the sites and the amount of equipment required that packstock be used. Due to the lack of maintained trails, extreme terrain, and the need to minimize impacts in these pristine areas it was decided that Llamas would be used. Three Llamas were rented for the season and worked quite well for the crew.

Sample locations were documented using a Global Positioning System and marked on a set of 7.5 minute USGS quadrangle maps, which can be found in appendix 1. Differences in the resolution of coordinates, which can be found in the sample location table, are due to the fact that some of the GPS files were unretrievable upon returning from the field. For these sites latitude and longitude was measured by hand using the quadrangle sheets as a reference. Locations measured on the quadrangle sheets were measured to the nearest second, while the GPS unit measured latitude and longitude to the nearest thousandth of a second (.001).

The protocols used for sample collection, handling, shipment, and quality assurance/quality control came from the US Forest Service Rocky Mountain Region Lake Chemistry Sampling Program and can be found in appendix A. These protocols have been used in past synoptic surveys and are currently used by National Outdoor Leadership School samplers working for Region 2 of the Forest Service.

SUMMARY

Results of chemical analysis were received from the Forest Services Rocky Mountain Experiment Station, in Fort Collins Colorado, in early January 1998. The Acid Neutralizing Capacity (ANC) of the sampled lakes ranged from 168.9 at Plain Lake in the central Wind River Range to 7.4 at Upper Frozen Lake in the southern portion of the range. Of the 55 lakes sampled, 43 were below 100 ANC and 5 lakes were below 25 ANC. The most sensitive lakes, below 25 ANC, were distributed throughout the range and were found near the tops of drainages where the watersheds were relatively small and isolated and soils were poorly developed or non-existent. Lake chemistry from some areas would seem to suggest that extremely low ANC's can be very localized and be greatly effected by drainage size and elevation. For example, in the Middle Fork of Boulder Creek, Noel lake sits near the top of the drainage at an elevation of 11,581 feet and has an ANC of 9.0. Noel Lake seeps through a terminal moraine and has no outlet. Less than 400 yards downstream, where it emerges from the rock as a running outlet, at 11,500 feet, it has an ANC of 98.5. A mile downstream from Noel Lake, Lee Lake has an ANC of 92.7.

The upper most portions of Clear Creek, on the north end of the range, were found to be extremely sensitive. Three of the four lakes sampled in that area had ANC's of less than 25. With potential oil and gas leasing being evaluated in an area directly upwind of Clear Creek, this seemed to be a significant find.

On the south end of the range, in the Little Sandy drainage, Upper Frozen Lake was found to have an ANC of 7.4. It's location in the southern end of the Class 1 Bridger Wilderness, and it's proximity to other lakes which are sampled on a recurring basis by the Bridger-Teton would make it an excellent candidate for future long term monitoring.

1997 EPA LAKES
Wind River Mountains
Sample Locations

SAMPLE DATE	LAB SAMPLE	LAKE NAME (Wilderness)	QUAD NAME	ELEVATION (feet)	LATITUDE (deg min sec)	LONGITUDE (deg min sec)
7/30/97	BT304	Lake 10,839 (BRID)	Temple Peak	10,839	42 41 42.951	109 09 22.104
7/30/97	BT305	Upper Frozen Lake (BRID)	Temple Peak	11,440	42 41 08.278	109 09 38.158
7/30/97	BT302	Upper Temple Lake (BRID)	Temple Peak	11,025	42 42 09.682	109 10 32.240
7/30/97	BT302	Upper Temple Lake (BRID)	Temple Peak	11,025	42 42 09.682	109 10 32.240
8/1/97	BT303	Steeple Lake (BRID)	Temple Peak	10,775	42 43 04.826	109 09 14.611
8/1/97	BT301	East Temple Lake (BRID)	Temple Peak	10,780	42 42 56.388	109 09 10.411
8/8/97	BT306	Dog Head Lake (PoAg)	Sweetwater Gap	11,100	42 42 16	109 06 07
8/8/97	BT308	Barrel Lake (PoAg)	Sweetwater Gap	11,085	42 42 11	109 06 10
8/8/97	BT307	Teepee Lake (PoAg)	Sweetwater Gap	10,780	42 42 47	109 05 48
8/9/97	BT388	Cornice Lake (PoAg)	Sweetwater Gap	11,100	42 41 44	109 06 27
8/9/97	BT386	Upper Tayo Lake (PoAg)	Temple Peak	11,145	42 41 31.147	109 07 32.578
8/9/97	BT387	Upper Tayo Lake (PoAg)	Temple Peak	11,145	42 41 31.147	109 07 32.578
8/10/97	BT389	Terrace Lake (PoAg)	Sweetwater Gap	10,600	42 43 20.212	109 05 27.392
8/10/97	BT390	Deep Creek Lake (PoAg)	Sweetwater Gap	10,840	42 43 46.067	109 06 16.354
8/11/97	BT391	Long Lake (PoAg)	Dickinson Park	10,421	42 44 56.350	109 07 13.676
8/11/97	BT392	Bighorn Lake (PoAg)	Sweetwater Gap	10,080	42 44 43.473	109 07 18.746
8/12/97	BT393	Arrowhead Lake (BRID)	Lizard Head Peak	10,420	42 45 42.429	109 12 38.078
8/21/97	BT336	Lake 10,842 (BRID)	Fremont Peak S	10,842	43 03 48.136	109 34 09.321
8/21/97	BT329	Cook Lake (BRID)	Fremont Peak S	10,170	43 02 23.022	109 36 02.164
8/21/97	BT334	Lake 10,488 (BRID)	Fremont Peak S	10,488	43 04 06	109 35 15
8/22/97	BT327	Angel Pass Lake (BRID)	Fremont Peak S	11,200	43 01 03.297	109 32 45.075
8/22/97	BT335	Angel Pass Lake (BRID)	Fremont Peak S	11,200	43 01 03.297	109 32 45.075
8/22/97	BT333	Talus Lake (BRID)	Fremont Peak S	11,640	43 02 12.067	109 33 18.046
8/22/97	BT326	Taco Lake (BRID)	Fremont Peak S	10,950	43 01 57.342	109 33 5.0278
8/22/97	BT330	Tres Lake (FITZ)	Fremont Peak S	11,120	43 02 02.483	109 32 26.334
8/23/97	BT339	Mount Lester Lake (BRID)	Fremont Peak S	10,905	43 03 29.489	109 36 49.771
8/24/97	BT332	Timico Lake (BRID)	Horseshoe Lake	10,512	42 59 18.378	109 32 50.903
8/24/97	BT331	Fall Creek Lake (BRID)	Fremont Peak S	11,045	43 00 24.910	109 32 04.884
8/25/97	BT338	Whale Lake (FITZ)	Fremont Peak S	11,125	43 01 03	109 31 42
8/25/97	BT337	Beth Lake (BRID)	Fremont Peak S	10,755	43 00 03.728	109 30 19.405
9/6/97	BT343	Lake Portofino (BRID)	Halls Mtn.	11,023	42 57 48.529	109 26 39.568
9/6/97	BT350	Lake Portofino (BRID)	Halls Mtn.	11,023	42 57 48.529	109 26 39.568
9/6/97	BT346	Wolfgang Lake (BRID)	Halls Mtn.	10,741	42 57 17.874	109 27 01.499
9/6/97	BT357	Glacier Lake (BRID)	Halls Mtn.	10,555	42 58 52.579	109 29 15.288
9/6/97	BT355	Long Lake (BRID)	Halls Mtn.	10,683	42 57 23.941	109 27 47.918
9/7/97	BT347	Lake 10,806 (BRID)	Halls Mtn.	10,806	42 55 09	109 26 44
9/7/97	BT351	Horseshoe Nail Lake (BRID)	Halls Mtn.	10,640	42 55 06	109 25 41
9/7/97	BT356	Shoestring Lake (BRID)	Halls Mtn.	11,664	42 56 20	109 25 13
9/7/97	BT353	Halls Lake (BRID)	Halls Mtn.	10,602	42 55 58	109 25 05
9/7/97	BT360	Plain Lake	Halls Mtn.	10,630	42 55 41	109 24 51
9/8/97	BT359	Hanging Rock Lake (BRID)	Roberts Mtn. \ Halls Mtn.	10,935	42 55 54	109 22 14
9/8/97	BT342	Hanging Rock Lake (BRID)	Roberts Mtn. \ Halls Mtn.	10,935	42 55 54	109 22 14
9/8/97	BT348	Bewmark Lake (BRID)	Roberts Mtn.	10,765	42 55 20	109 21 45
9/8/97	BT349	Bewmark Lake (BRID)	Roberts Mtn.	10,765	42 55 20	109 21 45
9/9/97	BT341	Lee Lake (BRID).	Roberts Mtn.	10,305	42 54 15	109 21 13
9/9/97	BT354	Noel Lake (BRID)	Roberts Mtn.	11,581	42 53 30	109 19 57
9/9/97	BT344	Noel Lake Outlet Stream (BRID)	Robrts Mtn.	11,500	42 53 36	109 20 10
9/9/97	BT345	Sheila Lake (BRID)	Roberts Mtn.	11,015	42 52 43	109 20 24
9/10/97	BT358	Middle Fork Lake (BRID)	Roberts Mtn. \ Halls Mtn.	10,252	42 54 48	109 23 00
9/19/97	BT363	Elephant Head Lake (BRID)	Fremont Peak S	10,794	43 05 19.551	109 37 15.782
9/19/97	BT361	Lake Frankie (BRID)	Fremont Peak S	10,990	43 05 55.678	109 37 01.772
9/19/97	BT362	Lake 10,813 (BRID)	Fremont Peak S	10,813	43 05 37.000	109 37 06.786
9/20/97	BT365	Lake 10,467 (BRID)	Bridger Lakes	10,467	43 05 25.134	109 38 04.154
9/20/97	BT364	Lower Titcomb (BRID)	Bridger Lakes	10,575	43 06 30.463	109 38 13.500
9/25/97	BT372	Lazy Boy Lake (BRID)	Downs Mtn.	11,630	43 19 56.823	109 43 47.249
9/25/97	BT369	Elkhorn Lake (BRID)	Downs Mtn.	11,270	43 19 56.616	109 44 10.302
9/25/97	BT370	Elkhorn Lake (BRID)	Downs Mtn.	11,270	43 19 56.616	109 44 10.302
9/25/97	BT368	Sheep Eater Lake (BRID)	Downs Mtn.	11,684	43 19 38.967	109 43 05.473
9/25/97	BT371	Duck Head Lake (BRID)	Downs Mtn.	11,090	43 19 40.146	109 44 10.207
9/26/97	BT367	Cresent Lake (BRID)	Downs Mtn.	10,739	43 20 09.019	109 45 05.932
9/26/97	BT366	Native Lake (BRID)	Green River Lakes	9,925	43 20 47.295	109 46 06.638
10/9/97	BT377	Steeple Lake (BRID)	Temple Peak	10,775	42 43 04.826	109 09 14.611
10/9/97	BT378	East Temple Lake (BRID)	Temple Peak	10,780	42 42 56.388	109 09 10.411

Number of samples: 63

LAB ID#	LAKE NAME	WILDERNESS	MILITARY TIME	SAMPLE DATE	JULIAN DATE	RECEIVE DATE	pH	uS/cm Conduct.	MG/L Ca	MG/L Mg	MG/L Na	MG/L K	MG/L NH4	MG/L F
BT304	LAKE 10,839	BRIDGER	1230	07/30/97	211	08/07/97	6.582	10.435	1.526	0.130	0.356	0.283	0.000	0.000
BT305	UPPER FROZEN LK	BRIDGER	1425	07/30/97	211	08/07/97	5.949	4.504	0.233	0.038	0.122	0.074	0.036	0.000
BT302	UPPER TEMPLE LK	BRIDGER	1715	07/30/97	211	08/07/97	6.286	8.674	0.952	0.091	0.216	0.243	0.036	0.000
BT303	STEEPLE LAKE	BRIDGER	1218	08/01/97	213	08/07/97	6.599	9.716	1.230	0.139	0.314	0.198	0.000	0.000
BT301	EAST TEMPLE LAKE	BRIDGER	1316	08/01/97	213	08/07/97	6.409	7.404	0.895	0.112	0.176	0.183	0.000	0.000
BT306	DOGHEAD LAKE	POPO	1330	08/08/97	220	08/12/97	6.539	11.963	1.563	0.209	0.447	0.379	0.000	0.000
BT308	BARREL LAKE	POPO	1425	08/08/97	220	08/12/97	6.440	9.063	1.132	0.182	0.331	0.284	0.000	0.000
BT307	TEEPEE LAKE	POPO	1745	08/08/97	220	08/12/97	6.368	8.899	0.989	0.124	0.278	0.274	0.000	0.000
BT388	CORNICE LAKE	POPO	1440	08/09/97	221	08/15/97	6.549	9.856	1.044	0.124	0.309	0.337	0.000	0.000
BT386	UPPER TAYO	POPO	1645	08/09/97	221	8/15/97	6.621	14.054	1.890	0.180	0.368	0.337	0.000	0.000
BT387	UPPER TAYO DUP	POPO	1645	08/09/97	221	08/15/97	6.679	14.219	2.098	0.188	0.372	0.343	0.000	0.000
BT389	TERRACE LAKE	POPO	1600	08/10/97	222	08/15/97	6.836	12.545	1.445	0.195	0.509	0.278	0.000	0.000
BT390	DEEP CREEK LAKE	POPO	1850	08/10/97	222	08/15/97	6.741	8.618	1.051	0.148	0.389	0.191	0.000	0.000
BT391	LONG LAKE	POPO	1625	08/11/97	223	08/15/97	6.671	8.666	1.080	0.133	0.275	0.151	0.000	0.000
BT392	BIGHORN LAKE	POPO	1720	08/11/97	223	08/15/97	6.679	12.356	1.512	0.184	0.445	0.303	0.023	0.000
BT393	ARROWHEAD LAKE	BRIDGER	1350	08/12/97	224	08/15/97	6.923	22.012	3.218	0.266	0.572	0.521	0.000	0.000
BT329	COOK LAKE	BRIDGER	1200	08/21/97	233	09/02/97	6.599	8.100	1.101	0.134	0.315	0.231	0.000	0.000
BT336	LAKE 10,842	BRIDGER	1515	08/21/97	233	09/02/97	6.572	6.826	0.786	0.127	0.331	0.219	0.000	0.000
BT334	LAKE 10,488	BRIDGER	1730	08/21/97	233	09/02/97	6.680	10.564	1.372	0.159	0.409	0.317	0.000	0.000
BT340	SNOWFLAKE LAKE	FITZPAT	1230	08/22/97	234	09/02/97	6.557	6.708	0.844	0.105	0.248	0.196	0.000	0.000
BT326	TACO LAKE	BRIDGER	1310	08/22/97	234	09/02/97	6.495	8.135	1.130	0.125	0.308	0.258	0.000	0.000
BT333	TALUS LAKE	BRIDGER	1415	08/22/97	234	09/02/97	6.583	9.161	0.962	0.199	0.642	0.260	0.000	0.000
BT330	TRES LAKE	FITZPAT	1550	08/22/97	234	09/02/97	6.304	4.893	0.387	0.072	0.275	0.102	0.000	0.000
BT327	ANGEL PASS LAKE	FITZPAT	1800	08/22/97	234	09/02/97	6.428	6.932	0.863	0.107	0.290	0.129	0.000	0.000
BT335	ANGEL PASS DUPE	FITZPAT	1800	08/22/97	234	09/02/97	6.554	6.767	0.927	0.116	0.300	0.144	0.000	0.000
BT339	MOUNT LESTER LAKE	BRIDGER	1545	08/23/97	235	09/02/97	6.800	9.691	1.456	0.149	0.381	0.315	0.000	0.000
BT332	TIMICO LAKE	BRIDGER	1420	08/24/97	236	09/02/97	6.897	15.551	2.889	0.214	0.492	0.188	0.000	0.000
BT331	FALL CREEK LAKE	BRIDGER	1720	08/24/97	236	09/02/97	6.849	12.568	2.203	0.191	0.324	0.113	0.000	0.000
BT338	WHALE LAKE	FITZPAT	1120	08/25/97	237	09/02/97	6.580	6.084	0.856	0.106	0.247	0.105	0.000	0.000
BT337	BETH LAKE	BRIDGER	1315	08/25/97	237	09/02/97	6.840	10.493	1.638	0.209	0.434	0.101	0.000	0.000
BT343	LAKE PORTOFINO	BRIDGER	1245	09/06/97	249	09/15/97	6.645	11.599	1.930	0.138	0.292	0.311	0.017	0.000
BT350	LAKE PORTOFINO DUPE	BRIDGER	1245	09/06/97	249	09/15/97	6.872	11.646	1.860	0.136	0.287	0.307	0.024	0.000
BT346	WOLFGAN LAKE	BRIDGER	1445	09/06/97	249	09/15/97	6.718	14.406	2.178	0.186	0.427	0.305	0.023	0.000
BT357	GLACIER LAKE	BRIDGER	1720	09/06/97	249	09/15/97	6.911	12.991	1.964	0.241	0.610	0.236	0.022	0.000
BT355	LONG LAKE	BRIDGER	1900	09/06/97	249	09/15/97	6.586	11.275	1.763	0.174	0.305	0.207	0.040	0.000

LAB ID#	LAKE NAME	WILDERNESS	MILITARY TIME	SAMPLE DATE	JULIAN DATE	RECEIVE DATE	pH	uS/cm Conduct.	MG/L Ca	MG/L Mg	MG/L Na	MG/L K	MG/L NH4	MG/L F
BT347	LAKE 10,806	BRIDGER	1245	09/07/97	250	09/15/97	6.786	9.326	1.227	0.204	0.489	0.199	0.000	0.000
BT351	HORSESHOE NAIL LAKE	BRIDGER	1410	09/07/97	250	09/15/97	6.873	11.947	1.655	0.208	0.483	0.415	0.021	0.000
BT356	SHOESTRING LAKE	BRIDGER	1455	09/07/97	250	09/15/97	6.586	10.764	1.587	0.146	0.359	0.257	0.000	0.000
BT353	HALLS LAKE	BRIDGER	1555	09/07/97	250	09/15/97	6.679	12.214	1.921	0.188	0.368	0.271	0.000	0.000
BT360	PLAIN LAKE	BRIDGER	1630	09/07/97	250	09/15/97	6.854	17.898	2.510	0.412	0.567	0.737	0.017	0.000
BT342	HANGING ROCK LAKE	BRIDGER	1330	09/08/97	251	09/15/97	6.478	7.725	1.082	0.142	0.257	0.160	0.000	0.000
BT348	BEWMARK LAKE	BRIDGER	1615	09/08/97	251	09/15/97	6.578	9.558	1.351	0.185	0.341	0.169	0.000	0.000
BT349	BEWMARK DUPE	BRIDGER	1615	09/08/97	251	09/15/97	6.534	9.744	1.255	0.176	0.339	0.159	0.000	0.000
BT341	LEE LAKE	BRIDGER	1145	09/09/97	252	09/15/97	6.801	11.010	1.540	0.169	0.473	0.331	0.000	0.000
BT354	NOEL LAKE	BRIDGER	1330	09/09/97	252	09/15/97	6.022	4.825	0.428	0.055	0.111	0.078	0.020	0.000
BT344	NOEL LAKE OUTLET	BRIDGER	1435	09/09/97	252	09/15/97	6.831	13.595	1.594	0.253	0.941	0.397	0.000	0.000
BT345	SHEILA LAKE	BRIDGER	1715	09/09/97	252	09/15/97	6.708	9.767	1.320	0.116	0.287	0.254	0.052	0.000
BT352	DONNA LAKE	BRIDGER	1745	09/09/97	252	09/15/97	6.558	6.484	0.772	0.081	0.192	0.205	0.045	0.000
BT358	MIDDLE FORK LAKE	BRIDGER	1100	09/10/97	253	09/15/97	6.642	11.252	1.730	0.197	0.429	0.235	0.000	0.000
BT361	LAKE FRANKIE	BRIDGER	1405	09/19/97	262	09/25/97	6.633	8.290	1.256	0.132	0.318	0.265	0.016	0.000
BT362	LAKE 10,813	BRIDGER	1550	09/19/97	262	09/25/97	6.410	6.990	1.093	0.118	0.284	0.241	0.000	0.000
BT363	ELEPHANT LAKE	BRIDGER	1600	09/19/97	262	09/25/97	6.589	6.680	1.063	0.113	0.278	0.207	0.000	0.000
BT364	LOWER TITCOMB LAKE	BRIDGER	1705	09/20/97	263	09/25/97	6.321	6.880	1.105	0.109	0.251	0.294	0.000	0.000
BT365	LAKE 10,467	BRIDGER	1855	09/20/97	263	09/25/97	6.349	6.910	1.058	0.109	0.241	0.248	0.000	0.000
BT369	ELKHORN LAKE	BRIDGER	1335	09/25/97	268	10/01/97	6.271	6.860	0.657	0.140	0.210	0.275	0.000	0.000
BT370	ELKHORN DUP	BRIDGER	1335	09/25/97	268	10/01/97	6.270	6.918	0.677	0.142	0.216	0.278	0.000	0.000
BT372	LAZY BOY LAKE	BRIDGER	1450	09/25/97	268	10/01/97	6.200	5.621	0.607	0.112	0.200	0.228	0.008	0.000
BT368	SHEEPEATER	BRIDGER	1653	09/25/97	268	10/01/97	6.251	10.520	1.073	0.215	0.502	0.294	0.029	0.000
BT371	DUCKHEAD LAKE	BRIDGER	1820	09/25/97	268	10/01/97	6.684	10.486	1.360	0.227	0.315	0.421	0.020	0.000
BT367	CRESCENT LAKE	BRIDGER	1000	09/26/97	269	10/01/97	6.715	13.098	1.904	0.267	0.385	0.617	0.000	0.000
BT366	NATIVE LAKE	BRIDGER	1200	09/26/97	269	10/01/97	6.644	12.258	1.835	0.260	0.451	0.409	0.018	0.000
BT377	STEEPLE LAKE	BRIDGER	1600	10/09/97	282	10/17/97	6.575	9.140	1.183	0.139	0.281	0.172	0.028	0.000
BT378	EAST TEMPLE LAKE	BRIDGER	1630	10/09/97	282	10/17/97	6.477	8.181	0.952	0.123	0.211	0.172	0.023	0.000
BT299	FIELD BLANK					08/06/97	5.541	1.152	0.000	0.000	0.000	0.000	0.000	0.000
BT300	FIELD BLANK					08/06/97	5.263	1.514	0.000	0.000	0.000	0.000	0.000	0.000
BT328	FIELD BLANK					09/02/97	5.516	12.000	0.032	0.000	0.012	0.000	0.000	0.000
BT359	FIELD BLANK					09/15/97	5.474	1.583	0.000	0.000	0.083	0.047	0.000	0.000
BT373	FIELD BLANK					10/01/97	5.495	0.928	0.000	0.000	0.000	0.011	0.000	0.000

LAB ID#	MG/L Cl	MG/L NO3	MG/L SO4	UEQ/L ANC	MG/L PO4	pH	UEQ/L CA	UEQ/L MG	UEQ/L NA	UEQ/L K	UEQ/L NH4	UEQ/L CL	UEQ/L NO3	UEQ/L SO4	UEQ/L [ANC]	SUM ANIONS	SUM CATIONS
BT304	0.067	0.352	0.516	83.4	0.000	0.26182	76.12275	10.71384	15.49385	7.245839	0	1.889826	5.683422	10.74147	83.4	101.7147	109.8381
BT305	0.101	0.441	0.386	7.4	0.000	1.12460	11.60679	3.085785	5.306708	1.902896	1.995753	2.846021	7.109116	8.030598	7.4	25.38574	25.02253
BT302	0.099	0.608	0.640	42.5	0.000	0.51761	47.49501	7.4964	9.408533	6.225335	2.006841	2.778326	9.807289	13.32326	42.5	68.40887	73.14972
BT303	0.092	0.671	0.771	52.7	0.000	0.25177	61.38224	11.42152	13.64955	5.051371	0	2.597806	10.82334	16.0487	52.7	82.16985	91.75644
BT301	0.082	0.850	0.574	32.8	0.000	0.38994	44.67066	9.183296	7.672978	4.690741	0	2.324204	13.71505	11.95116	32.8	60.79041	66.60762
BT306	0.214	0.058	0.913	94.1	0.000	0.28907	78.00965	17.20693	19.42705	9.70524	0	6.041802	0.933797	19.01151	94.1	120.0871	124.6379
BT308	0.092	0.374	0.467	74.0	0.000	0.36308	56.48837	14.9563	14.37874	7.274909	0	2.600626	6.030169	9.725415	74	92.35621	93.46139
BT307	0.123	0.289	0.566	66.9	0.000	0.42855	49.36013	10.21362	12.09435	7.017334	0	3.477844	4.66576	11.78876	66.9	86.83236	79.11397
BT388	0.150	0.440	0.407	65.9	0.000	0.28249	52.12075	10.17045	13.44248	8.615918	0	4.233774	7.089762	8.472	65.9	85.69554	84.63208
BT386	0.119	0.353	1.525	99.0	0.000	0.23933	94.28837	14.78788	16.01203	8.627252	0	3.350915	5.694711	31.7497	99	139.7953	133.9549
BT387	0.125	0.354	1.548	97.5	0.000	0.20941	104.6721	15.49372	16.16208	8.783538	0	3.525795	5.710839	32.22442	97.5	138.961	145.3209
BT389	0.168	0.000	0.830	96.8	0.000	0.14588	72.09498	16.08509	22.13951	7.104299	0	4.727386	0	17.2813	96.8	118.8087	117.5698
BT390	0.117	0.301	0.555	65.5	0.000	0.18155	52.46646	12.17802	16.93341	4.88218	0	3.302964	4.848004	11.54724	65.5	85.19821	86.64162
BT391	0.119	0.000	0.654	60.0	0.000	0.21330	53.89922	10.90333	11.95537	3.856305	0	3.365018	0	13.62099	60	76.98601	80.82754
BT392	0.124	0.821	0.988	84.8	0.000	0.20941	75.45865	15.12689	19.33912	7.745917	1.253365	3.50323	13.23605	20.57307	84.8	122.1124	119.1334
BT393	0.134	0.136	2.628	162.0	0.000	0.11940	160.6009	21.8819	24.86302	13.33686	0	3.790934	2.198213	54.70884	162	222.698	220.8021
BT329	0.082	0.000	0.738	66.5	0.000	0.25177	54.95501	11.02973	13.69084	5.89785	0	2.309406	0	15.37095	66.5	84.18035	85.82519
BT336	0.079	0.000	0.600	53.1	0.000	0.26792	39.23222	10.43775	14.41517	5.588844	0	2.22212	0	12.49899	53.1	67.82111	69.9419
BT334	0.090	0.192	1.000	74.6	0.000	0.20893	68.47302	13.0469	17.8071	8.098103	0	2.52644	3.090626	20.81524	74.6	101.0323	107.6341
BT340	0.066	0.530	0.462	46.6	0.000	0.27733	42.11523	8.626005	10.80561	5.025352	0	1.848478	8.548087	9.620868	46.6	66.61743	66.84953
BT326	0.093	0.100	0.696	64.6	0.000	0.31989	56.40004	10.25706	13.38221	6.60972	0	2.624079	1.61614	14.50111	64.6	83.34133	86.96893
BT333	0.143	0.000	0.788	73.8	0.000	0.26122	47.99501	16.41563	27.93022	6.651473	0	4.046299	0	16.40024	73.8	94.24654	99.25356
BT330	0.068	0.258	0.407	28.1	0.000	0.49659	19.29314	5.906284	11.95822	2.616338	0	1.924839	4.165432	8.473325	28.1	42.6636	40.27057
BT327	0.067	0.235	0.503	54.5	0.000	0.37325	43.05326	8.783509	12.61075	3.289502	0	1.896358	3.795439	10.4755	54.5	70.6673	68.11026
BT335	0.071	0.066	0.502	57.2	0.000	0.27925	46.27152	9.507131	13.04686	3.671719	0	2.003647	1.066209	10.44451	57.2	70.71436	72.77648
BT339	0.079	0.000	0.868	84.2	0.000	0.15849	72.65504	12.24805	16.55903	8.05704	0	2.215504	0	18.07115	84.2	104.4867	109.6776
BT332	0.103	0.000	1.096	152.6	0.000	0.12677	144.1768	17.63472	21.40428	4.814748	0	2.90173	0	22.82977	152.6	178.3315	188.1573
BT331	0.097	0.000	0.941	118.3	0.000	0.14158	109.9369	15.749	14.11341	2.878012	0	2.739693	0	19.58276	118.3	140.6225	142.8189
BT338	0.060	0.022	0.385	50.2	0.000	0.26303	42.71365	8.705198	10.7493	2.689204	0	1.70038	0.361506	8.014936	50.2	60.27682	65.12039
BT337	0.075	0.000	0.559	101.6	0.000	0.14454	81.74842	17.23868	18.86986	2.579991	0	2.112234	0	11.64698	101.6	115.3592	120.5815
BT343	0.080	0.095	0.975	103.0	0.000	0.22646	96.31877	11.32235	12.70542	7.944141	0.916931	2.260965	1.526781	20.29834	103	127.0861	129.4341
BT350	0.083	0.097	0.983	103.8	0.000	0.13428	92.80965	11.19683	12.49156	7.849434	1.352225	2.349532	1.558867	20.46129	103.8	128.1697	125.834
BT346	0.084	0.000	1.321	128.5	0.000	0.19143	108.6632	15.28808	18.57649	7.790594	1.266033	2.360808	0	27.50014	128.5	158.3609	151.7759
BT357	0.086	0.000	0.778	127.6	0.000	0.12274	98.00453	19.84511	26.51298	6.031501	1.192416	2.416319	0	16.20047	127.6	146.2168	151.7093
BT355	0.073	0.000	1.370	89.7	0.000	0.25942	87.97917	14.29645	13.2782	5.30691	2.222399	2.056518	0	28.52312	89.7	120.2796	123.3425

LAB ID#	MG/L Cl	MG/L NO3	MG/L SO4	UEQ/L ANC	MG/L PO4	pH	UEQ/L CA	UEQ/L MG	UEQ/L NA	UEQ/L K	UEQ/L NH4	UEQ/L CL	UEQ/L NO3	UEQ/L SO4	UEQ/L [ANC]	SUM ANIONS	SUM CATIONS
BT347	0.093	0.000	0.567	89.7	0.000	0.16368	61.23138	16.8148	21.26136	5.094422	0	2.630208	0	11.80207	89.7	104.1323	104.5656
BT351	0.101	0.026	0.801	113.9	0.000	0.13397	82.5817	17.12536	20.99451	10.61298	1.176108	2.857239	0.423089	16.66962	113.9	133.8499	132.6246
BT356	0.067	0.000	0.965	96.5	0.000	0.25942	79.17885	12.02309	15.63675	6.584674	0	1.875871	0	20.08424	96.5	118.4601	113.6828
BT353	0.090	0.000	1.182	109.6	0.000	0.20941	95.84795	15.4911	16.01306	6.922618	0	2.534971	0	24.60402	109.6	136.739	134.4841
BT360	0.125	0.000	1.603	168.9	0.000	0.13996	125.2489	33.92215	24.66589	18.85498	0.956504	3.51232	0	33.36557	168.9	205.7779	203.7884
BT342	0.067	0.000	0.684	64.7	0.000	0.33266	53.98257	11.68522	11.19432	4.1008	0	1.888197	0	14.24966	64.7	80.83786	81.29556
BT348	0.087	0.000	0.884	82.7	0.000	0.26424	67.43588	15.18307	14.85037	4.321084	0	2.452253	0	18.40549	82.7	103.5577	102.0546
BT349	0.076	0.000	0.878	81.7	0.000	0.29242	62.63554	14.52107	14.72608	4.055125	0	2.137033	0	18.28251	81.7	102.1195	96.23023
BT341	0.093	0.000	1.169	92.7	0.000	0.15812	76.86461	13.90302	20.57662	8.470528	0	2.619292	0	24.33193	92.7	119.6512	119.9729
BT354	0.107	0.531	0.716	9.0	0.000	0.95060	21.34902	4.513396	4.82071	1.992029	1.096918	3.028525	8.560173	14.90344	9	35.49214	34.72268
BT344	0.141	0.862	1.396	98.5	0.000	0.14757	79.55463	20.80279	40.94972	10.14939	0	3.978258	13.89898	29.06578	98.5	145.443	151.6041
BT345	0.126	0.189	1.330	66.6	0.000	0.19588	65.85315	9.559811	12.46793	6.50023	2.887481	3.556218	3.049322	27.69883	66.6	100.9044	97.46449
BT352	0.090	0.312	0.590	44.7	0.000	0.27669	38.4999	6.625338	8.35152	5.237042	2.521794	2.528998	5.033193	12.29278	44.7	64.55497	61.51229
BT358	0.095	0.000	1.036	100.8	0.000	0.22803	86.34616	16.22593	18.6541	6.022489	0	2.685477	0	21.56679	100.8	125.0523	127.4767
BT361	0.074	0.195	0.870	65.9	0.000	0.23281	62.69157	10.86823	13.84807	6.785853	0.873802	2.084683	3.143537	18.10472	65.9	89.23294	95.30034
BT362	0.072	0.314	0.734	56.7	0.000	0.38905	54.55288	9.723379	12.3583	6.171738	0	2.028051	5.066913	15.28975	56.7	79.08472	83.19535
BT363	0.107	0.036	0.731	58.9	0.000	0.25763	53.06326	9.278961	12.08368	5.288624	0	3.029811	0.585584	15.22083	58.9	77.73623	79.97215
BT364	0.121	0.164	0.914	54.7	0.000	0.47753	55.15913	8.982704	10.89752	7.522814	0	3.403712	2.644549	19.02488	54.7	79.77314	83.03969
BT365	0.079	0.195	0.844	55.3	0.000	0.44771	52.7866	8.995636	10.49649	6.348496	0	2.217938	3.150715	17.56648	55.3	78.23513	79.07493
BT369	0.086	0.925	1.028	22.2	0.000	0.53580	32.78812	11.52695	9.130192	7.030466	0	2.437601	14.91422	21.41015	22.2	60.96197	61.01152
BT370	0.096	0.925	1.031	24.0	0.000	0.53703	33.7707	11.72104	9.416744	7.119337	0	2.698479	14.92262	21.47467	24	63.09577	62.56486
BT372	0.066	0.827	0.725	18.8	0.000	0.63096	0	0	0	0	0	1.855915	13.32971	15.10274	18.8	49.08837	0.630957
BT368	0.194	2.823	1.067	24.6	0.000	0.56105	53.54228	17.67794	21.85176	7.530545	1.584001	5.478976	45.53427	22.21262	24.6	97.82587	102.7476
BT371	0.108	0.398	1.370	72.5	0.000	0.20701	67.88762	18.71449	13.71797	10.75841	1.086464	3.0432	6.426599	28.52506	72.5	110.4949	112.372
BT367	0.092	0.000	1.729	102.5	0.000	0.19275	94.98736	21.93348	16.72526	15.77151	0	2.598394	0	36.00438	102.5	141.1028	149.6104
BT366	0.096	0.000	1.401	102.3	0.000	0.22699	91.59028	21.37103	19.62981	10.4712	0.989034	2.721374	0	29.16643	102.3	134.1878	144.2783
BT377	0.097	0.656	0.983	57.3	0.000	0.26607	59.04272	11.39779	12.20172	4.409735	1.569621	2.741048	10.57706	20.46681	57.3	91.08492	88.88767
BT378	0.144	0.842	0.739	46.2	0.000	0.33343	47.49112	10.12104	9.163582	4.39298	1.255732	4.05927	13.57669	15.38723	46.2	79.22319	72.75788
BT299	0.000	0.000	0.000	-2.9	0.000	2.87740	0	0	0	0	0	0	0	0	-2.9	-2.9	2.877398
BT300	0.000	0.000	0.000	-2.6	0.000	5.45758	0	0	0	0	0	0	0	0	-2.6	-2.6	5.457579
BT328	0.005	0.000	0.000	0.1	0.000	3.04789	1.608627	0	0.512349	0	0	0.14691	0	0	0.1	0.24691	5.16887
BT359	0.066	0.000	0.035	3.0	0.000	3.35738	0	0	3.630225	1.191746	0	1.864426	0	0.732879	3	5.597305	8.179348
BT373	0.000	0.000	0.000	0.2	0.000	3.19890	#REF!	#REF!	#REF!	#REF!	#REF!	0	0	0	0.2	0.2	#REF!

QA/QC Section:

LAB ID#	TOTAL ION	%ION DIFF	SUM BASES	SUM ACIDS	DIFF= ALK	ANC	FLAG %ION	% COND DIFF	FLAG % COND	THEOR. COND
BT304	211.5528	-3.83989	109.5763	18.31472	91.26157	83.4	OK	3.411227	OK	10.79096
BT305	50.40827	0.72052	21.90218	17.98574	3.91644	7.4	OK	-26.2802	OK	3.320342
BT302	141.5586	-3.34904	70.62528	25.90887	44.71641	42.5	OK	-10.161	OK	7.792631
BT303	173.9263	-5.51187	91.50467	29.46985	62.03483	52.7	OK	-4.51219	OK	9.277595
BT301	127.398	-4.56616	66.21767	27.99041	38.22726	32.8	OK	-4.5273	OK	7.068799
BT306	244.725	-1.85956	124.3489	25.98711	98.36175	94.1	OK	5.228083	OK	12.58844
BT308	185.8176	-0.59477	93.09831	18.35621	74.7421	74	OK	5.354421	OK	9.548271
BT307	165.9463	4.651137	78.68542	19.93236	58.75306	66.9	OK	-2.77621	OK	8.651945
BT388	170.3276	0.624357	84.3496	19.79554	64.55406	65.9	OK	-9.89443	OK	8.880805
BT386	273.7502	2.133503	133.7155	40.79533	92.9202	99	OK	1.934175	OK	14.32583
BT387	284.2819	-2.23716	145.1115	41.46105	103.6504	97.5	OK	4.715981	OK	14.88957
BT389	236.3784	0.524126	117.4239	22.00868	95.4152	96.8	OK	-4.74328	OK	11.94996
BT390	171.8398	-0.83997	86.46007	19.69821	66.76186	65.5	OK	2.384215	OK	8.823472
BT391	157.8135	-2.43422	80.61423	16.98601	63.62822	60	OK	-6.68961	OK	8.086279
BT392	241.2457	1.234839	117.6706	37.31235	80.35823	84.8	OK	2.790783	OK	12.70083
BT393	443.5001	0.427477	220.6827	60.69799	159.9847	162	OK	4.427125	OK	22.9865
BT329	170.0055	-0.96752	85.57343	17.68035	67.89307	66.5	OK	7.653244	OK	8.719913
BT336	137.763	-1.53945	69.67399	14.72111	54.95288	53.1	OK	3.996356	OK	7.098791
BT334	208.6664	-3.16378	107.4251	26.43231	80.99281	74.6	OK	2.670722	OK	10.84614
BT340	133.467	-0.1739	66.5722	20.01743	46.55477	46.6	OK	5.338322	OK	7.066095
BT326	170.3103	-2.12999	86.64904	18.74133	67.90771	64.6	OK	8.393021	OK	8.817772
BT333	193.5001	-2.5876	98.99234	20.44654	78.5458	73.8	OK	7.914419	OK	9.88604
BT330	82.93417	2.885453	39.77398	14.5636	25.21038	28.1	OK	-7.90715	OK	4.506103
BT327	138.7776	1.842543	67.73701	16.1673	51.56971	54.5	OK	3.528641	OK	7.176605
BT335	143.4908	-1.43711	72.49723	13.51436	58.98287	57.2	OK	8.106918	OK	7.315595
BT339	214.1643	-2.42383	109.5191	20.28665	89.2325	84.2	OK	12.64538	OK	10.91646
BT332	366.4888	-2.68107	188.0306	25.7315	162.2991	152.6	OK	17.36343	OK	18.25119
BT331	283.4414	-0.77493	142.6773	22.32246	120.3549	118.3	OK	12.61726	OK	14.15374
BT338	125.3972	-3.86258	64.85736	10.07682	54.78054	50.2	OK	4.39924	OK	6.35165
BT337	235.9407	-2.21339	120.437	13.75921	106.6777	101.6	OK	10.83904	OK	11.63034
BT343	256.5202	-0.91533	128.2907	24.08608	104.2046	103	OK	12.88442	OK	13.09346
BT350	254.0037	0.919559	124.3475	24.36969	99.97778	103.8	OK	11.14176	OK	12.94357
BT346	310.1368	2.123286	150.3184	29.86095	120.4575	128.5	OK	9.175619	OK	15.72784
BT357	297.9261	-1.84357	150.3941	18.61679	131.7773	127.6	OK	13.77536	OK	14.78056
BT355	243.6222	-1.25723	120.8607	30.57964	90.28108	89.7	OK	11.93835	OK	12.62105

LAB ID#	TOTAL ION	%ION DIFF	SUM BASES	SUM ACIDS	DIFF= ALK	ANC	FLAG %ION	% COND DIFF	FLAG % COND	THEOR. COND
BT347	208.6979	-0.20765	104.402	14.43228	89.96968	89.7	OK	11.30033	OK	10.37987
BT351	266.4746	0.459826	131.3145	19.94994	111.3646	113.9	OK	12.28993	OK	13.41528
BT356	232.1429	2.057925	113.4234	21.96011	91.46325	96.5	OK	9.465495	OK	11.78287
BT353	271.2231	0.831363	134.2747	27.13899	107.1357	109.6	OK	12.8098	OK	13.77859
BT360	409.5663	0.485762	202.6919	36.87789	165.814	168.9	OK	16.08705	OK	20.77726
BT342	162.1334	-0.2823	80.9629	16.13786	64.82505	64.7	OK	7.270878	OK	8.286675
BT348	205.6124	0.731039	101.7904	20.85774	80.93265	82.7	OK	9.25526	OK	10.44262
BT349	198.3498	2.969154	95.93782	20.41954	75.51828	81.7	OK	3.351072	OK	10.07053
BT341	239.6241	-0.13425	119.8148	26.95122	92.86356	92.7	OK	11.57448	OK	12.28435
BT354	70.21482	1.095865	32.67516	26.49214	6.183017	9	OK	-8.24724	OK	4.427071
BT344	297.0471	-2.07411	151.4565	46.94302	104.5135	98.5	OK	14.58957	OK	15.57845
BT345	198.3689	1.734081	94.38113	34.30437	60.07676	66.6	OK	8.496623	OK	10.59687
BT352	126.0673	2.413541	58.7138	19.85497	38.85883	44.7	OK	4.357181	OK	6.76652
BT358	252.529	-0.96007	127.2487	24.25226	102.9964	100.8	OK	13.77262	OK	12.80169
BT361	184.5333	-3.28797	94.19373	23.33294	70.86079	65.9	OK	16.1395	OK	9.627965
BT362	162.2801	-2.53305	82.8063	22.38472	60.42158	56.7	OK	22.47178	OK	8.560778
BT363	157.7084	-1.41776	79.71452	18.83623	60.87829	58.9	OK	22.38757	OK	8.175489
BT364	162.8128	-2.00632	82.56216	25.07314	57.48902	54.7	OK	26.71505	OK	8.717995
BT365	157.3101	-0.53385	78.62722	22.93513	55.69209	55.3	OK	20.84875	OK	8.350649
BT369	121.9735	-0.04062	60.47572	38.76197	21.71375	22.2	OK	4.337348	OK	7.157542
BT370	125.6606	0.422497	62.02783	39.09577	22.93206	24	OK	6.129047	OK	7.342007
BT372	49.71932	97.46192	0	30.28837	-30.2884	18.8	Check	-42.3814	Check	3.238739
BT368	200.5734	-2.45382	100.6025	73.22587	27.37666	24.6	OK	13.72252	OK	11.96361
BT371	222.8668	-0.84225	111.0785	37.99486	73.08363	72.5	OK	13.42024	OK	11.89325
BT367	290.7131	-2.92646	149.4176	38.60277	110.8148	102.5	OK	16.08527	OK	15.20485
BT366	278.4661	-3.62361	143.0623	31.88781	111.1745	102.3	OK	17.17397	OK	14.36319
BT377	179.9726	1.220885	87.05197	33.78492	53.26705	57.3	OK	5.76161	OK	9.6667
BT378	151.9811	4.254019	71.16872	33.02319	38.14554	46.2	OK	1.870698	OK	8.334053
BT299	-0.0226	25561.92	0	0	0	-2.9	Check	-23.5547	OK	0.880649
BT300	2.857579	-281.972	0	0	0	-2.6	Check	18.6785	OK	1.796793
BT328	5.415781	-90.8818	2.120975	0.14691	1.974065	0.1	Check	-90.0752	Check	1.190976
BT359	13.77665	-18.7422	4.821972	2.597305	2.224666	3	OK	11.35501	OK	1.76275
BT373	#REF!	#REF!	#REF!	0	#REF!	0.2	####	#REF!	####	#REF!

SAMPLE DATE	LAB SAMPLE	LAKE NAME (Wilderness)	PHOTO PAGE #
7/30/97	BT304	Lake 10,839 (BRID)	A1-1
7/30/97	BT305	Upper Frozen Lake (BRID)	A1-1
7/30/97	BT302	Upper Temple Lake (BRID)	A1-2
8/1/97	BT301	East Temple Lake (BRID)	A1-3
8/1/97	BT303	Steeple Lake (BRID)	A1-2
8/8/97	BT308	Barrel Lake (POAG)	A1-3
8/8/97	BT306	Dog Head Lake (POAG)	A1-4
8/8/97	BT307	Teepee Lake (POAG)	A1-5
8/9/97	BT388	Cornice Lake (POAG)	A1-5
8/9/97	BT386	Upper Tayo Lake (POAG)	A1-6
8/9/97	BT387	Upper Tayo Lake (POAG)	A1-6
8/10/97	BT390	Deep Creek Lake (POAG)	A1-6
8/10/97	BT389	Terrace Lake (POAG)	A1-7
8/11/97	BT392	Bighorn Lake (POAG)	A1-8
8/11/97	BT391	Long Lake (POAG)	A1-8
8/12/97	BT393	Arrowhead Lake (BRID)	A1-9
8/21/97	BT334	Lake 10,488 (BRID)	A1-10
8/21/97	BT329	Cook Lake (BRID)	A1-10
8/21/97	BT336	Lake 10,842 (BRID)	A1-9
8/22/97	BT327	Angel Pass Lake (BRID)	A1-13
8/22/97	BT335	Angel Pass Lake (BRID)	A1-13
8/22/97	BT340	Snowflake Lake (FITZ)	A1-12
8/22/97	BT326	Taco Lake (BRID)	A1-11
8/22/97	BT333	Talus Lake (BRID)	A1-11
8/22/97	BT330	Tres Lake (FITZ)	A1-12
8/23/97	BT339	Mount Lester Lake (BRID)	A1-13
8/24/97	BT331	Fall Creek Lake (BRID)	A1-14
8/24/97	BT332	Timico Lake (BRID)	A1-14
8/25/97	BT337	Beth Lake (BRID)	A1-15
8/25/97	BT338	Whale Lake (FITZ)	A1-15
9/6/97	BT357	Glacier Lake (BRID)	A1-17
9/6/97	BT343	Lake Portofino (BRID)	A1-16
9/6/97	BT350	Lake Portofino (BRID)	A1-16
9/6/97	BT355	Long Lake (BRID)	A1-17
9/6/97	BT346	Wolfgang Lake (BRID)	A1-16
9/7/97	BT353	HALLS (BRID)	A1-20
9/7/97	BT351	Horseshoe Nail Lake (BRID)	A1-19
9/7/97	BT347	Lake 10,806 (BRID)	A1-18
9/7/97	BT360	Plain Lake (BRID)	A1-20
9/7/97	BT356	Shoestring Lake (BRID)	A1-18
9/8/97	BT348	Bewmark Lake (BRID)	A1-21
9/8/97	BT349	Bewmark Lake (BRID)	A1-21
9/8/97	BT342	Hanging Rock Lake (BRID)	A1-21
9/9/97	BT341	Lee Lake (BRID).	A1-22
9/9/97	BT354	Noel Lake (BRID)	A1-22
9/9/97	BT344	Noel Lake Outlet Stream (BRID)	A1-23
9/9/97	BT345	Sheila Lake (BRID)	A1-24
9/9/97	BT352	Donna Lake (BRID)	A1-23
9/10/97	BT358	Middle Fork Lake (BRID)	A1-25
9/19/97	BT363	Elephant Head Lake (BRID)	A1-25
9/19/97	BT362	Lake 10,813 (BRID)	A1-26
9/19/97	BT361	Lake Frankie (BRID)	A1-26
9/20/97	BT365	Lake 10,467 (BRID)	A1-27
9/20/97	BT364	Lower Titcomb (BRID)	A1-27
9/25/97	BT371	Duck Head Lake (BRID)	A1-29
9/25/97	BT369	Elkhorn Lake (BRID)	A1-28
9/25/97	BT370	Elkhorn Lake (BRID)	A1-28
9/25/97	BT372	Lazy Boy Lake (BRID)	A1-28
9/25/97	BT368	Sheep Eater Lake (BRID)	A1-29
9/26/97	BT367	Cresent Lake (BRID)	A1-30
9/26/97	BT366	Native Lake (BRID)	A1-30
10/9/97	BT378	East Temple Lake (BRID)	A1-3
10/9/97	BT377	Steeple Lake (BRID)	A1-2

LAKE NAME (Wilderness)	SAMPLE DATE	LAB SAMPLE	PHOTO PAGE #
Angel Pass Lake (BRID)	8/22/97	BT327	A1-13
Angel Pass Lake (BRID)	8/22/97	BT335	A1-13
Arrowhead Lake (BRID)	8/12/97	BT393	A1-9
Barrel Lake (POAG)	8/8/97	BT308	A1-3
Beth Lake (BRID)	8/25/97	BT337	A1-15
Bewmark Lake (BRID)	9/8/97	BT348	A1-21
Bewmark Lake (BRID)	9/8/97	BT349	A1-21
Bighorn Lake (POAG)	8/11/97	BT392	A1-8
Cook Lake (BRID)	8/21/97	BT329	A1-10
Cornice Lake (POAG)	8/9/97	BT388	A1-5
Cresent Lake (BRID)	9/26/97	BT367	A1-30
Deep Creek Lake (POAG)	8/10/97	BT390	A1-6
Dog Head Lake (POAG)	8/8/97	BT306	A1-4
Donna Lake (BRID)	9/9/97	BT352	A1-23
Duck Head Lake (BRID)	9/25/97	BT371	A1-29
East Temple Lake (BRID)	8/1/97	BT301	A1-3
East Temple Lake (BRID)	10/9/97	BT378	A1-3
Elephant Head Lake (BRID)	9/19/97	BT363	A1-25
Elkhorn Lake (BRID)	9/25/97	BT369	A1-28
Elkhorn Lake (BRID)	9/25/97	BT370	A1-28
Fall Creek Lake (BRID)	8/24/97	BT331	A1-14
Glacier Lake (BRID)	9/6/97	BT357	A1-17
HALLS (BRID)	9/7/97	BT353	A1-20
Hanging Rock Lake (BRID)	9/8/97	BT342	A1-21
Horseshoe Nail Lake (BRID)	9/7/97	BT351	A1-19
Lake 10,467 (BRID)	9/20/97	BT365	A1-27
Lake 10,488 (BRID)	8/21/97	BT334	A1-10
Lake 10,806 (BRID)	9/7/97	BT347	A1-18
Lake 10,813 (BRID)	9/19/97	BT362	A1-26
Lake 10,839 (BRID)	7/30/97	BT304	A1-1
Lake 10,842 (BRID)	8/21/97	BT336	A1-9
Lake Frankie (BRID)	9/19/97	BT361	A1-26
Lake Portofino (BRID)	9/6/97	BT343	A1-16
Lake Portofino (BRID)	9/6/97	BT350	A1-16
Lazy Boy Lake (BRID)	9/25/97	BT372	A1-28
Lee Lake (BRID).	9/9/97	BT341	A1-22
Long Lake (POAG)	8/11/97	BT391	A1-8
Long Lake (BRID)	9/6/97	BT355	A1-17
Lower Titcomb (BRID)	9/20/97	BT364	A1-27
Middle Fork Lake (BRID)	9/10/97	BT358	A1-25
Mount Lester Lake (BRID)	8/23/97	BT339	A1-13
Native Lake (BRID)	9/26/97	BT366	A1-30
Noel Lake (BRID)	9/9/97	BT354	A1-22
Noel Lake Outlet Stream (BRID)	9/9/97	BT344	A1-23
Plain Lake (BRID)	9/7/97	BT360	A1-20
Sheep Eater Lake (BRID)	9/25/97	BT368	A1-29
Sheila Lake (BRID)	9/9/97	BT345	A1-24
Shoestring Lake (BRID)	9/7/97	BT356	A1-18
Snowflake Lake (FITZ)	8/22/97	BT340	A1-12
Steeple Lake (BRID)	8/1/97	BT303	A1-2
Steeple Lake (BRID)	10/9/97	BT377	A1-2
Taco Lake (BRID)	8/22/97	BT326	A1-11
Talus Lake (BRID)	8/22/97	BT333	A1-11
Teepee Lake (POAG)	8/8/97	BT307	A1-5
Terrace Lake (POAG)	8/10/97	BT389	A1-7
Timico Lake (BRID)	8/24/97	BT332	A1-14
Tres Lake (FITZ)	8/22/97	BT330	A1-12
Upper Frozen Lake (BRID)	7/30/97	BT305	A1-1
Upper Tayo Lake (POAG)	8/9/97	BT386	A1-6
Upper Tayo Lake (POAG)	8/9/97	BT387	A1-6
Upper Temple Lake (BRID)	7/30/97	BT302	A1-2
Whale Lake (FITZ)	8/25/97	BT338	A1-15
Wolfgang Lake (BRID)	9/6/97	BT346	A1-16

SAMPLE LAB	DATE SAMPLE	LAKE NAME (Wilderness)	PAGE # PHOTO
BT301	8/1/97	East Temple Lake (BRID)	A1-3
BT302	7/30/97	Upper Temple Lake (BRID)	A1-2
BT303	8/1/97	Steeple Lake (BRID)	A1-2
BT304	7/30/97	Lake 10,839 (BRID)	A1-1
BT305	7/30/97	Upper Frozen Lake (BRID)	A1-1
BT306	8/8/97	Dog Head Lake (POAG)	A1-4
BT307	8/8/97	Teepee Lake (POAG)	A1-5
BT308	8/8/97	Barrel Lake (POAG)	A1-3
BT326	8/22/97	Taco Lake (BRID)	A1-11
BT327	8/22/97	Angel Pass Lake (BRID)	A1-13
BT329	8/21/97	Cook Lake (BRID)	A1-10
BT330	8/22/97	Tres Lake (FITZ)	A1-12
BT331	8/24/97	Fall Creek Lake (BRID)	A1-14
BT332	8/24/97	Timico Lake (BRID)	A1-14
BT333	8/22/97	Talus Lake (BRID)	A1-11
BT334	8/21/97	Lake 10,488 (BRID)	A1-10
BT335	8/22/97	Angel Pass Lake (BRID)	A1-13
BT336	8/21/97	Lake 10,842 (BRID)	A1-9
BT337	8/25/97	Beth Lake (BRID)	A1-15
BT338	8/25/97	Whale Lake (FITZ)	A1-15
BT339	8/23/97	Mount Lester Lake (BRID)	A1-13
BT340	8/22/97	Snowflake Lake (FITZ)	A1-12
BT341	9/9/97	Lee Lake (BRID).	A1-22
BT342	9/8/97	Hanging Rock Lake (BRID)	A1-21
BT343	9/6/97	Lake Portofino (BRID)	A1-16
BT344	9/9/97	Noel Lake Outlet Stream (BRID)	A1-23
BT345	9/9/97	Sheila Lake (BRID)	A1-24
BT346	9/6/97	Wolfgang Lake (BRID)	A1-16
BT347	9/7/97	Lake 10,806 (BRID)	A1-18
BT348	9/8/97	Bewmark Lake (BRID)	A1-21
BT349	9/8/97	Bewmark Lake (BRID)	A1-21
BT350	9/6/97	Lake Portofino (BRID)	A1-16
BT351	9/7/97	Horseshoe Nail Lake (BRID)	A1-19
BT352	9/9/97	Donna Lake (BRID)	A1-23
BT353	9/7/97	HALLS (BRID)	A1-20
BT354	9/9/97	Noel Lake (BRID)	A1-22
BT355	9/6/97	Long Lake (BRID)	A1-17
BT356	9/7/97	Shoestring Lake (BRID)	A1-18
BT357	9/6/97	Glacier Lake (BRID)	A1-17
BT358	9/10/97	Middle Fork Lake (BRID)	A1-25
BT360	9/7/97	Plain Lake (BRID)	A1-20
BT361	9/19/97	Lake Frankie (BRID)	A1-26
BT362	9/19/97	Lake 10,813 (BRID)	A1-26
BT363	9/19/97	Elephant Head Lake (BRID)	A1-25
BT364	9/20/97	Lower Titcomb (BRID)	A1-27
BT365	9/20/97	Lake 10,467 (BRID)	A1-27
BT366	9/26/97	Native Lake (BRID)	A1-30
BT367	9/26/97	Cresent Lake (BRID)	A1-30
BT368	9/25/97	Sheep Eater Lake (BRID)	A1-29
BT369	9/25/97	Elkhorn Lake (BRID)	A1-28
BT370	9/25/97	Elkhorn Lake (BRID)	A1-28
BT371	9/25/97	Duck Head Lake (BRID)	A1-29
BT372	9/25/97	Lazy Boy Lake (BRID)	A1-28
BT377	10/9/97	Steeple Lake (BRID)	A1-2
BT378	10/9/97	East Temple Lake (BRID)	A1-3
BT386	8/9/97	Upper Tayo Lake (POAG)	A1-6
BT387	8/9/97	Upper Tayo Lake (POAG)	A1-6
BT388	8/9/97	Cornice Lake (POAG)	A1-5
BT389	8/10/97	Terrace Lake (POAG)	A1-7
BT390	8/10/97	Deep Creek Lake (POAG)	A1-6
BT391	8/11/97	Long Lake (POAG)	A1-8
BT392	8/11/97	Bighorn Lake (POAG)	A1-8
BT393	8/12/97	Arrowhead Lake (BRID)	A1-9

Lake 10,839
Bridger Wilderness
July 30, 1997
Sample BT 304

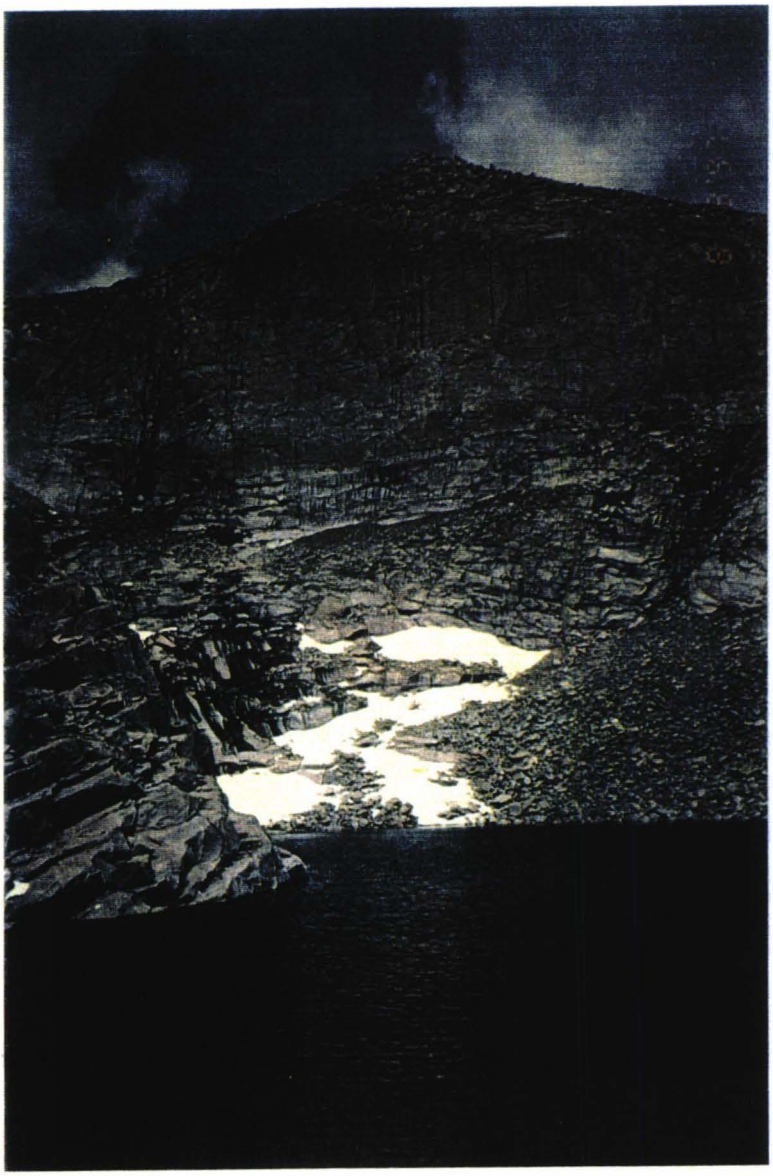
Upper Frozen Lake
Bridger Wilderness
July 30, 1997
Sample BT 305

Upper Temple Lake
Bridger Wilderness
July 30, 1997
Sample BT 302

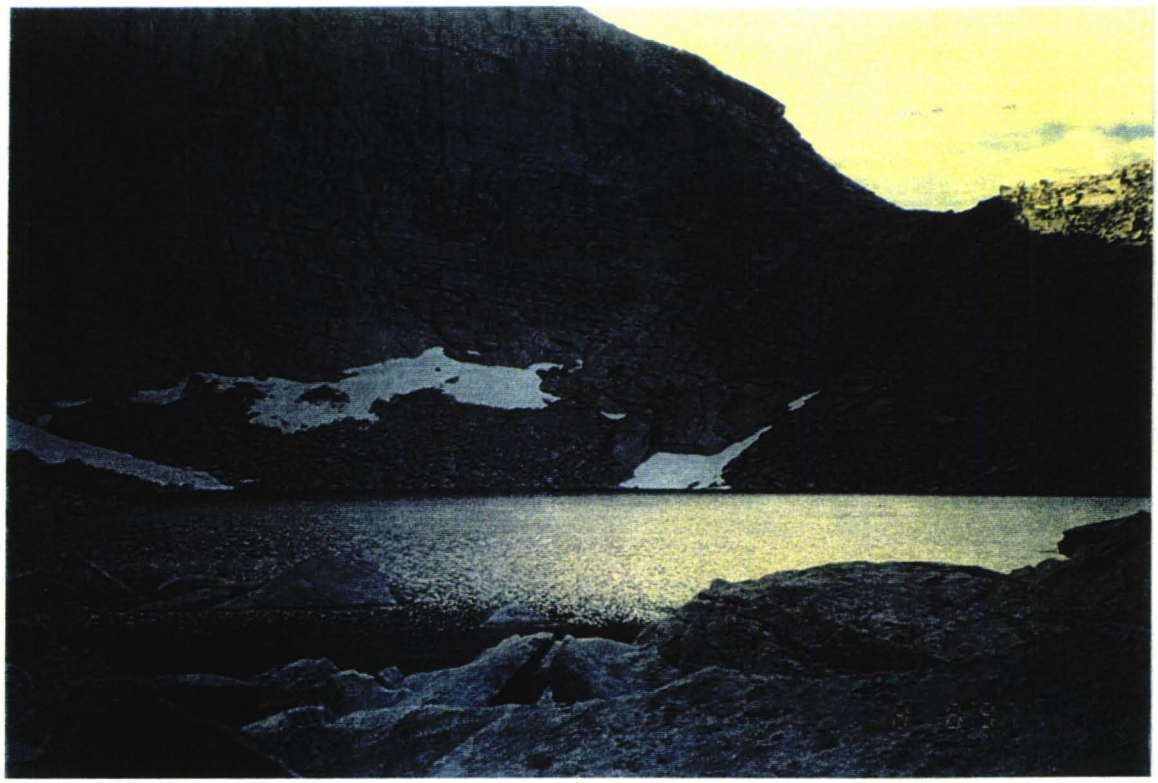
Steeple Lake
Bridger Wilderness
August 1, 1997, October 9, 1997
Samples BT 303, BT 377

East Temple Lake
Bridger Wilderness
August 1, 1997, October 9, 1997
Samples BT 301, BT 378

Barrel Lake
Popo Agie Wilderness
August 8, 1997
Sample BT 308



Dog Head Lake
Popo Agie Wilderness
August 8, 1997
Sample BT 306



Teepee Lake
Popo Agie Wilderness
August 8, 1997
Sample BT 307

Cornice Lake
Popo Agie Wilderness
August 9, 1997
Sample BT 388

Upper Tayo Lake
Popo Agie Wilderness
August 9, 1997
Samples BT 386, BT 387

Deep Creek Lake
Popo Agie Wilderness
August 10, 1997
Sample BT 390

Terrace Lake
Popo Agie Wilderness
August 10, 1997
Sample BT 389

Long Lake
Popo Agie Wilderness
August 11, 1997
Sample BT 391

Bighorn Lake
Popo Agie Wilderness
August 11, 1997
Sample BT 392

Arrowhead Lake
Bridger Wilderness
August 12, 1997
Sample BT 393

Lake 10,842
Bridger Wilderness
August 21, 1997
Sample BT 336

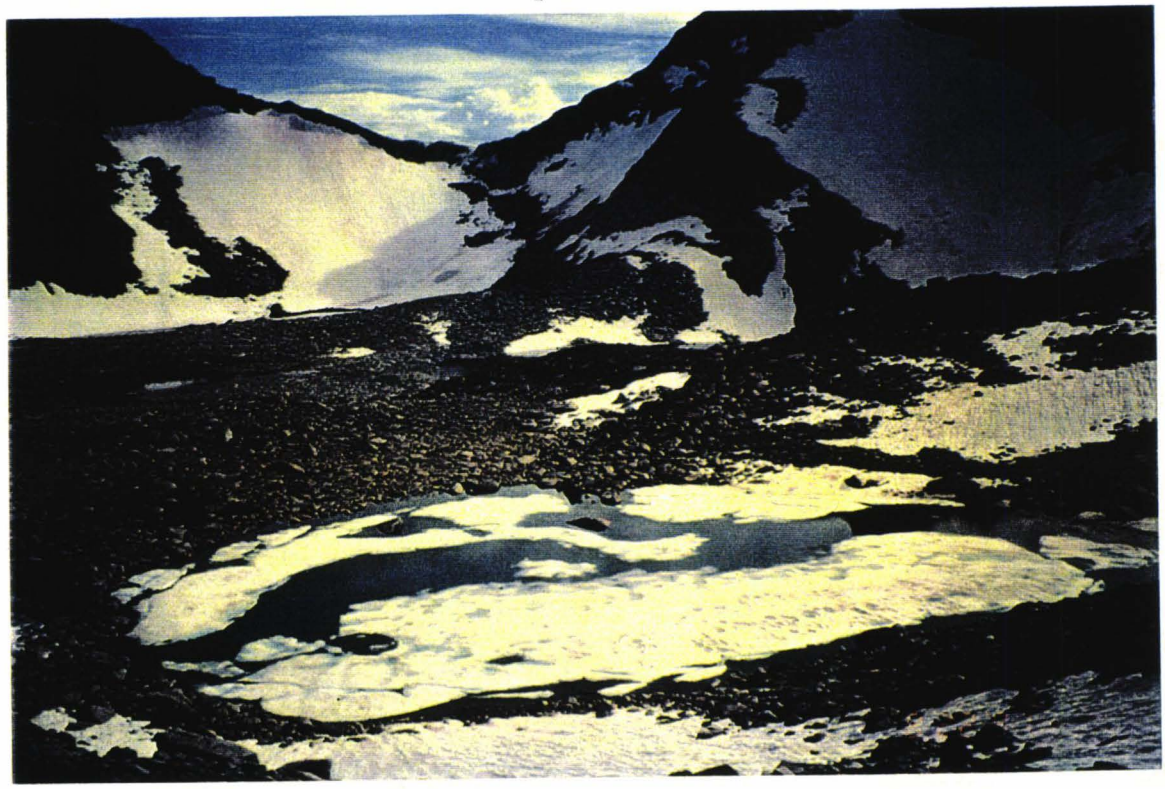
Cook Lake
Bridger Wilderness
August 21, 1997
Sample BT 329

Lake 10,488
Bridger Wilderness
August 21, 1997
Sample BT 334

Talus Lake
Bridger Wilderness
August 22, 1997
Sample BT 333

Taco Lake
Bridger Wilderness
August 22, 1997
Sample BT 326

Tres Lake
Fitzpatrick Wilderness
August 22, 1997
Sample BT 330



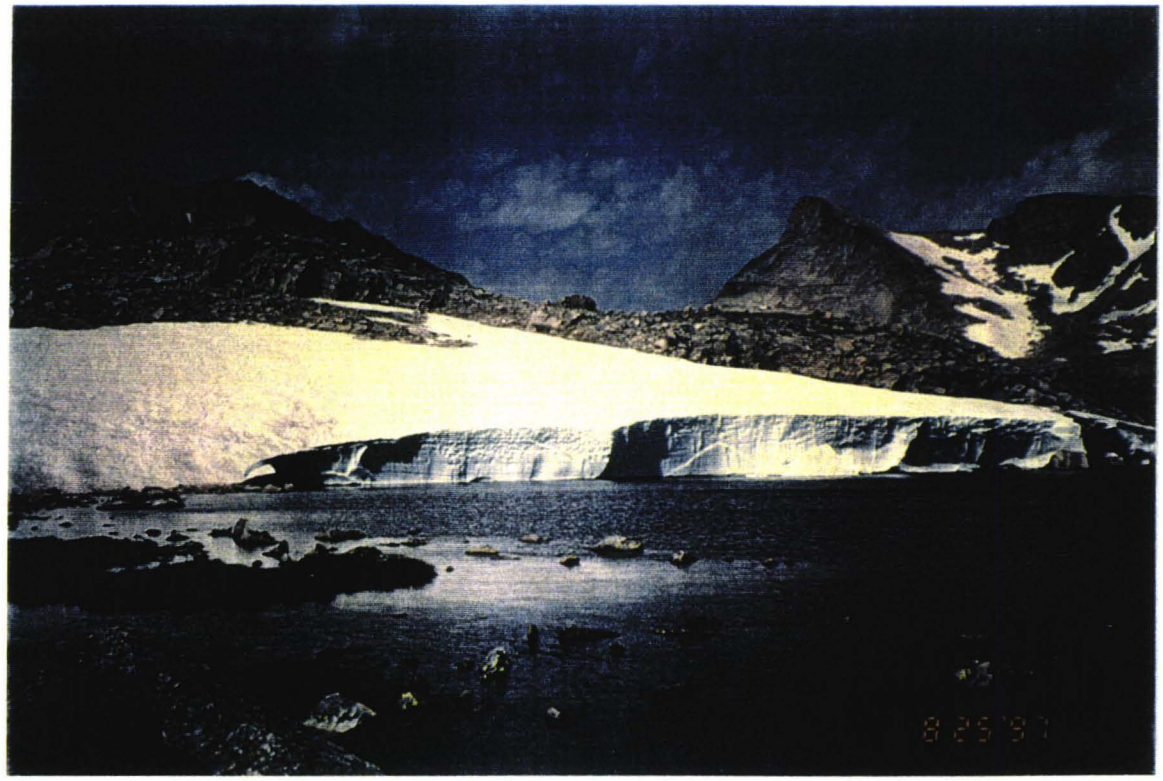
Snowflake Lake
Fitzpatrick Wilderness
August 22, 1997
Samples BT 328, BT340

Angel Pass Lake
Fitzpatrick Wilderness
August 22, 1997
Samples BT 327, BT 335

Mount Lester Lake (10,905)
Bridger Wilderness
August 23, 1997
Sample BT 339

Timico Lake
Bridger Wilderness
August 24, 1997
Sample BT 332

Fall Creek Lake
Bridger Wilderness
August 24, 1997
Sample BT 331



Whale Lake
Fitzpatrick Wilderness
August 25, 1997
Sample BT 338

Beth Lake
Bridger Wilderness
August 25, 1997
Sample BT 337

Lake Portifino
Bridger Wilderness
September 6, 1997
Samples BT 350, BT 343

Wolfgang Lake
Bridger Wilderness
September 6, 1997
Sample 346

Long Lake
Bridger Wilderness
September 6, 1997
Sample BT 355

Glacier Lake
Bridger Wilderness
September 6, 1997
Sample BT 357

Lake 10,806
Bridger Wilderness
September 7, 1997
Sample BT 347

Shoestring Lake
Bridger Wilderness
September 7, 1997
Sample BT 356

Horseshoe Nail Lake
Bridger Wilderness
September 7, 1997
Sample BT 351

Halls Lake
Bridger Wilderness
September 7, 1997
Sample BT 353

Plain Lake
Bridger Wilderness
September 7, 1997
Sample BT 360

Hanging Rock Lake
Bridger Wilderness
September 8, 1997
Samples BT 342, BT 359

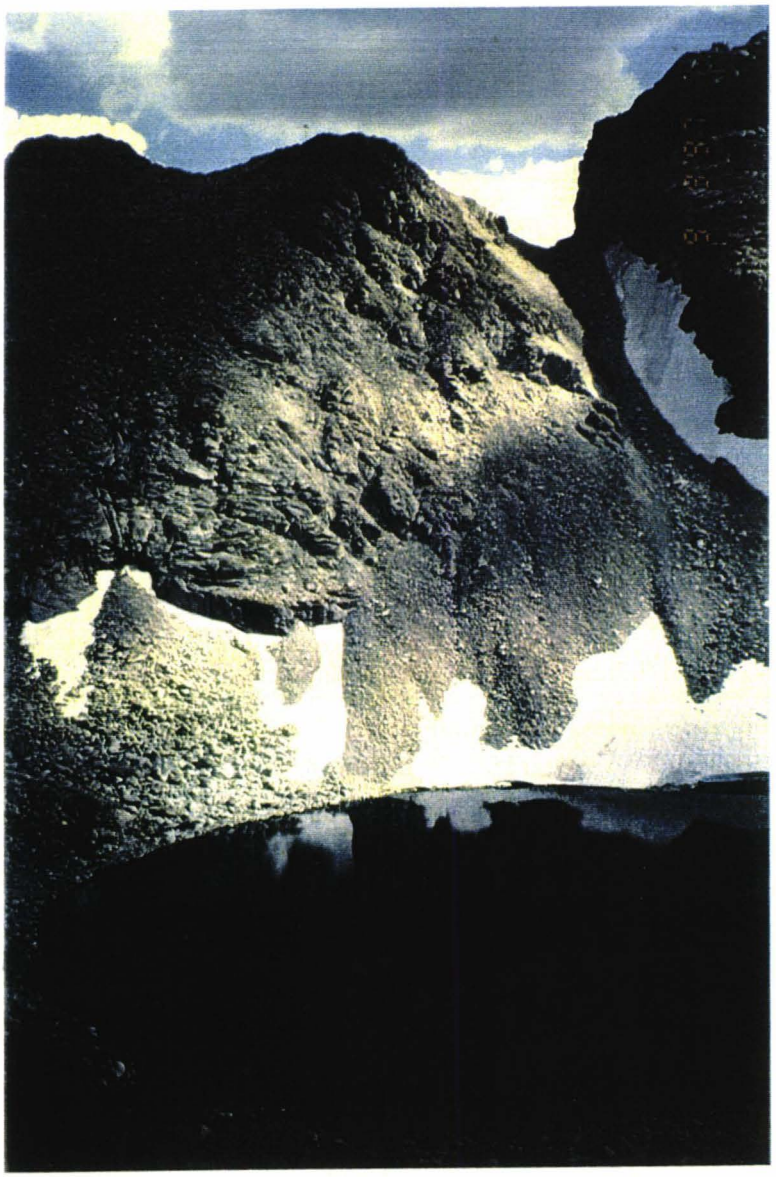
Bewmark Lake
Bridger Wilderness
September 8, 1997
Samples BT 348, BT349

Lee Lake
Bridger Wilderness
September 9, 1997
Sample BT 341

Noel Lake
Bridger Wilderness
September 9, 1997
Sample BT 354

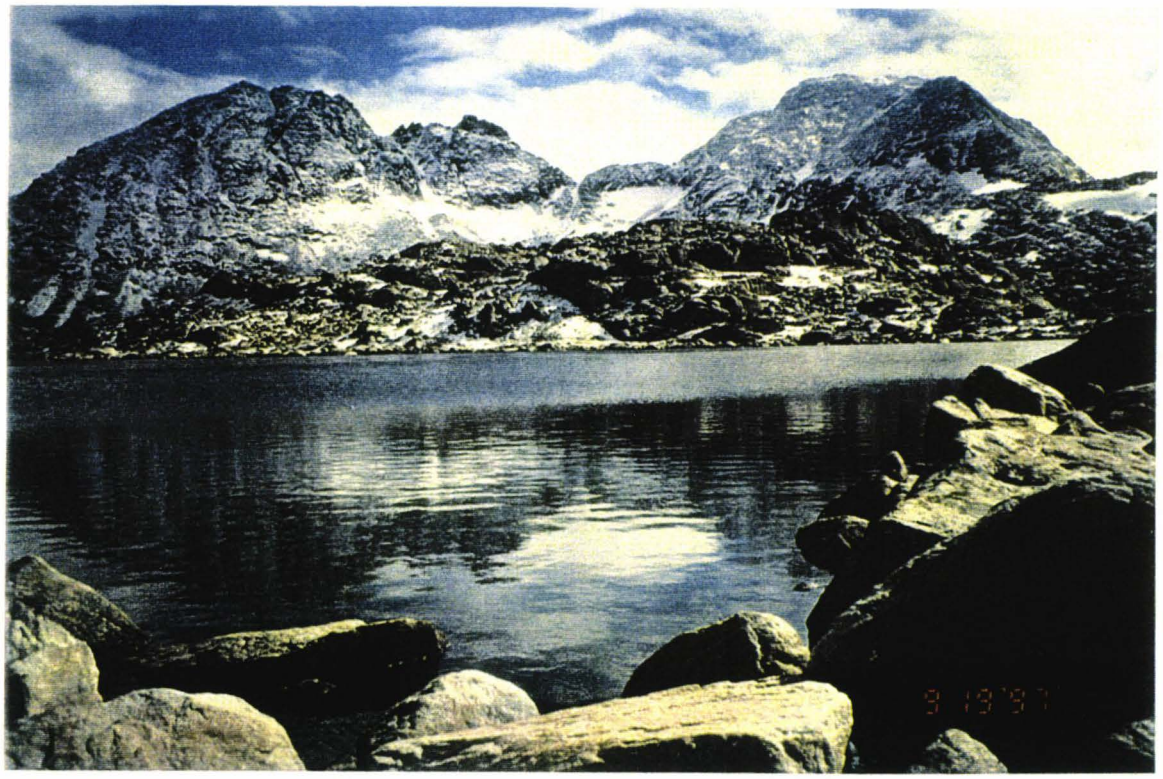
Noel Lake Outlet Stream
Bridger Wilderness
September 9, 1997
Sample BT 344

Donna Lake
Bridger Wilderness
September 9, 1997
Sample BT 352

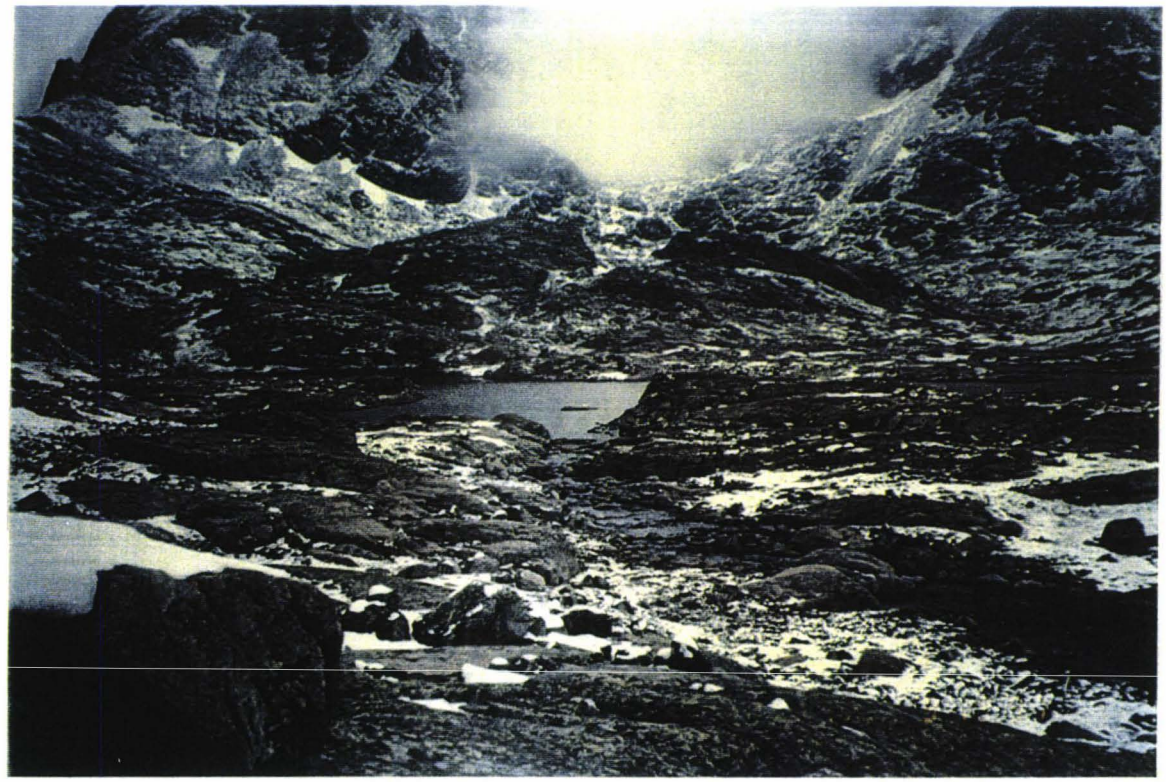


Sheila Lake
Bridger Wilderness
September 9, 1997
Sample BT 345

Middle Fork Lake
Bridger Wilderness
September 10, 1997
Sample BT 358



Elephant Head Lake
Bridger Wilderness
September 19, 1997
Sample BT 363



Lake Frankie
Bridger Wilderness
September 19, 1997
Sample BT 361

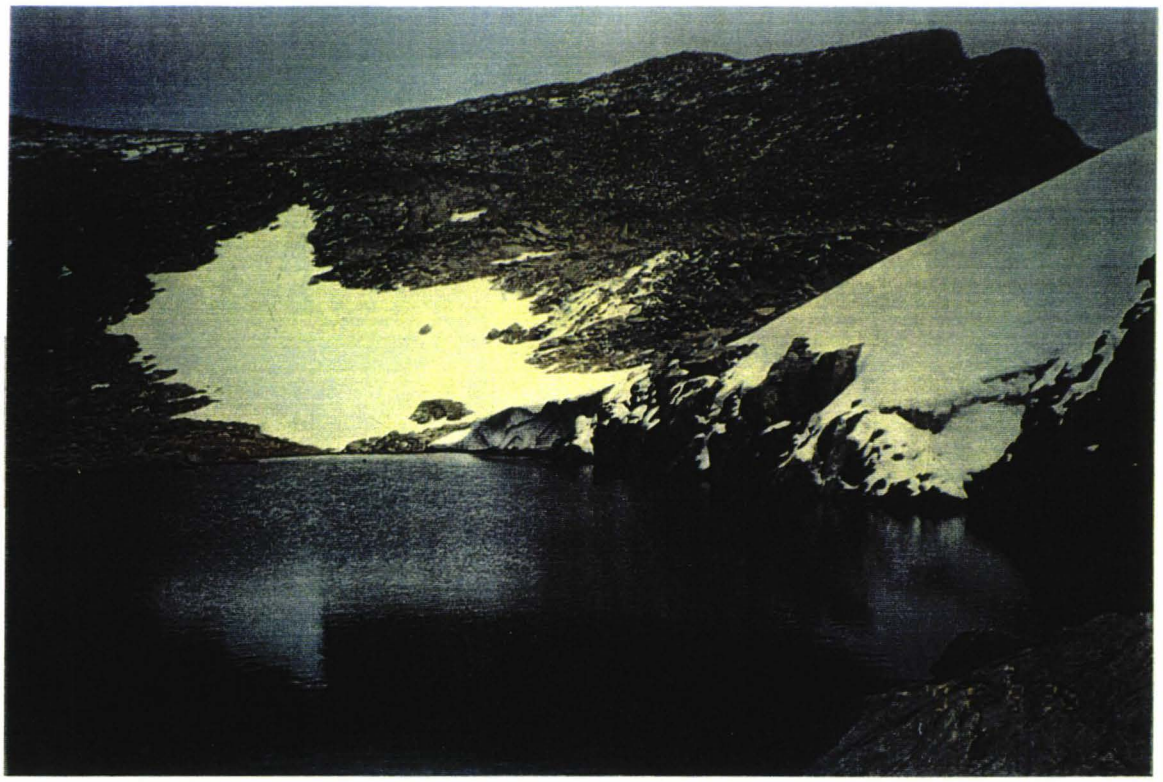
Lake 10,813
Bridger Wilderness
September 19, 1997
Sample BT 362

Lake 10,467
Bridger Wilderness
September 20, 1997
Sample BT 365

Lower Titcomb Lake
Bridger Wilderness
September 20, 1997
Sample BT 364

Lazy Boy Lake
Bridger Wilderness
September 25, 1997
Sample BT 372

Elkhorn Lake
Bridger Wilderness
September 25, 1997
Samples BT 369, BT 370



Sheep Eater Lake
Bridger Wilderness
September 25, 1997
Samples BT 368, BT 373

Duck Head Lake
Bridger Wilderness
September 25, 1997
Sample BT 371

Cresent Lake
Bridger Wilderness
September 26, 1997
Sample BT 367

Native Lake
Bridger Wilderness
September 26, 1997
Sample BT 366

Lake-Sampling Protocols for Initial Inventories

March 1996

INTRODUCTION

These protocols are part of the US Forest Service Rocky Mountain Region Lake Chemistry Sampling Program. The purpose of this program is to conduct initial inventories (synoptic surveys) of a large number of lakes in a wilderness to determine general chemical characteristics of these lakes. Often the lakes that will be part of the synoptic survey are preselected based on elevation, bedrock geology, and position in the drainage, in order to sample the subset of lakes likely to be most sensitive to acidic deposition.

PROCEDURE

1. Sampling Location

Samples should be taken near the flowing outlet of the lake, away from any aquatic vegetation and where the sampling activity will not disturb the sediments. If no flowing outflow from the lake exists, then select a rocky point or shoreline where there is good connection and circulation with the rest of the lake.

2. Collection Procedure

The Rocky Mountain Experiment Station Lab will provide the acid-washed 250-ml brown poly bottles. Use these bottles only. Bottles should be emptied of deionized (DI) water just before sampling (empty them onshore or away from where water samples are collected). The bottles can be emptied (and recapped) just before taking them into the field, if it is cumbersome to hike in with full bottles.

When collecting water samples, the bottles are submersed up to 0.5m depth (less depth if necessary to AVOID disturbing sediments), filled, capped, taken to the surface, and emptied, pouring the rinse water over the bottle caps. This filling-rinse procedure should be done three times. After the third filling-rinse, bottles should be filled such that **NO** air bubbles remain in the bottle, and capped very tightly while submerged.

Care should be taken not to contaminate the sample by collection of surface film, contact with the sampler's hands, etc. Long rubber gloves may may be useful from the point of view of the sampler, as well as to avoid some contamination problems. Caps should be taped to bottles with electrical tape to minimize sample leakage during transport.

3. Data Recording

Each sample should be carefully labeled on high-quality label tape with Wilderness name, lake name, date, time, and sampler's initials. Labels should be placed on bottles before sampling is begun, because they don't stick well to wet or damp bottles. The Field Lake-Sampling Form should be completed by the field crew with the sample information and any field comments regarding the lake's condition and weather. Also record any other information such as fish present, permanent snow fields at edge of lake,

lake is a large beaver pond, top lake in a cirque, no or little soils observed in watershed, evidence of significant visitor use, etc. Keep the original lake sampling form on the district and send a copy of each form to the RO.

4. Field Blanks and Duplicates

One out of every ten lake samples should be collected in duplicate. For every 20 lake samples, one field blank should be sent in for analysis. That is, every 10th lake sample should be taken as two filled 250-ml bottles. For every 20 samples collected, one bottle should be left full of DI water, carried into and out of the field with the other bottles, and sent to Fort Collins as a "field blank." These procedures are necessary to check the reproducibility of the lab results and are standard quality-assurance and quality-control procedures.

5. Sample Cooling and Shipping

Samples will not have any form of preservative added. After sample collection, bottles **MUST** be kept out of the sun and cool (but not frozen). The quality of the data gained will in part depend on keeping the samples as close to lake temperature as possible between the time of collection and the time of analysis. Samples should be refrigerated if there will be any lag time between returning from the field and shipping the bottles to the lab.

Samples should be shipped to the Fort Collins lab within 7 days of sampling. Bottles should be packed with the frozen ice packs in the insulated cooler provided by the Rocky Mountain Station Lab. Cost should dictate the form of shipping: bus lines, UPS, etc.

6. Sample Analysis at the Rocky Mountain Station Lab

Within 48 hours of receipt, samples will be analyzed for pH, alkalinity, conductivity, sulfate, nitrate, chloride, bromide, ammonium, and ortho-phosphate. Within one week, samples will be analyzed for calcium, magnesium, sodium, and phosphate. Each analysis will be conducted using EPA-approved standard methods.

7. Lake Photographs

Three to five pictures should be taken of each lake for use in identifying the amount of vegetation and soils in the watershed. Care needs to be taken to identify the lake in the picture. This can be accomplished by taking a picture of the name (or location) of the lake printed on a piece of paper at the beginning of each lake photo series.

DATA REPORTING

A paper copy of the lab results from all samples will be sent from the Rocky Mountain Station to the Forest contact person and to the Regional Office (c/o Tamara Franklin Blett) at the end of each field season (October). An electronic copy of the lab data will be sent to the Regional Office from the RMS lab at the end of the field season, as well.

Wind River Lakes Synoptic Survey

Lake _____ Quad _____ *Brid Fitz PoAg Res*

Latitude __ ° __ ' __ " Longitude ___ ° __ ' __ " Elevation_____ *feet meters*
UTM N _____ . _ E _____ . _
Location/access description _____

Sample collection

Name _____ Date __ / __ / 19 __ Time __ : __

Collection comments _____

Weather

Air temp ___ ° *C F (Est/Meas)* Wind Speed ___ mph Water temp ___ ° *C F (Est/Meas)*
Current Precipitation: *Rain Snow Hail Mixed None*
Weather/ water temperature comments _____

Sample condition

Sample type: *Regular Duplicate Blank* Condition: *Leakage Possible contamination Othe*
Comments _____

Site characterization

Photos: Roll # __ Frame #'s _____ # Inlets ___ # Outlets ___
% Basin in: bedrock___ talus___ bare soil___ grass/forb___ shrubs ___ trees___ snow/glac. __
Description _____

Sketch aerial view of lake on back of form. Show sampling location, geographic feature inlets/outlets, trails, campsites, tree stands, etc.

Chain of custody

Name	Date	Sample condition/notes
_____	__/__/19__	_____
_____	__/__/19__	_____
_____	__/__/19__	_____
_____	__/__/19__	_____
_____	__/__/19__	_____

Form: 7/18/97 AM

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

GREEN RIVER LAKES QUADRANGLE
WYOMING
7.5 MINUTE SERIES (TOPOGRAPHIC)

4070 IV NW (FISH CREEK PARK)

4070 I NW (SIMPSON LAKE)

109° 52′ 30″ — R. 109 W. — R. 108 W. — 92 000m E. — 93 — GUNSIGHT PASS 0.9 MI. — 94 — 50′ — 95 — 4070 IV NE (UNION PEAK) — 97 — 47′ 30″ — 98 — 580 000 FEET — 600 — 601 — 109° 45′

43° 22′ 30″

4802 000m N.

4802

4801

4800

4799

4798

4797

4796

4795

4794

4793

4792

950 000 FEET

4791

4790

4790 000m N.

43° 15′

560 000 FEET

(SQUARETOP MOUNTAIN) 4070 III NE

980 000 FEET

17′ 30″

T. 39 N.
T. 38 N.

R. 109 W.
R. 108 W.
R. 107 W.

1 12 13 24 25 30 31 36 19 20′

4070 IV SW (BIG SHEEP MOUNTAIN)

4070 I SW (DOWNS MOUNTAIN)

(KENDALL MOUNTAIN) 4070 III NW

(GANNETT PEAK) 4070 II NW

SHOSHONE NATIONAL FOREST

CONTINENTAL DIVIDE WILDERNESS BOUNDARY

SUBLETTE CO
FREMONT CO

WILDERNESS BOUNDARY (INDEFINITE)

WILDERNESS BOUNDARY

ROARING FORK BASIN

Roaring Fork

Alexander Park

Native Lake

Crescent Lake

Osborn Mountain

WILDERNESS

BRIDGER

NATIONAL FOREST

Mill Creek

Clear Lake

Clear Creek

Clear Creek Natural Bridge

Clear Creek Falls

Slide Creek Falls

Flat Top Mountain

Ram Pass

Fish Bowl Spring

Slide

Slide Lake

Creek

Lost Eagle Peak

Elbow Lake No 2

GREEN RIVER

Campground

GP Bar Ranch

Twin Lakes

Valaite Lake

Shirley Lake

Lake Gadsby

Porcupine Creek Falls

Porcupine Creek

LAKES

WHYTE ROCK

HIGHLINE TRAIL

PACK TRAIL

WILDERNESS BOUNDARY

LAKESIDE TRAIL

PORCUPINE TRAIL

BT 366

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1966. Field checked 1968

Polyconic projection. 1927 North American datum
10,000-foot grid based on Wyoming coordinate system, west zone
1000-metre Universal Transverse Mercator grid ticks, zone 12, shown in blue

Fine red dashed lines indicate selected fence lines

Where omitted, land lines have not been established

UTM GRID AND 1968 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

GN 0° 49′ 14 MILS — MN 16° 284 MILS

SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETRE

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

WYOMING
QUADRANGLE LOCATION

ROAD CLASSIFICATION
Light-duty

GREEN RIVER LAKES, WYO.
N4315—W10945/7.5

1968

AMS 4070 IV SE—SERIES V874

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1976

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

BRIDGER LAKES QUADRANGLE
WYOMING—SUBLETTE CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

4070 II NE (SQUARETOP MTN.)
4070 II NW (GANNETT PEAK)
4070 II NE (FREMONT PEAK NORTH)
4070 III SE (FREMONT LAKE NORTH)
4070 II SE (FREMONT PEAK SOUTH)
(FREMONT LAKE SOUTH) 4069 IV NE
(FAYETTE LAKE) 4069 I NW
(HORSESHOE LAKE) 4069 I NE

109° 45′ — 43° 07′ 30″ — 42′ 30″ — 40′ — 109° 37′ 30″ — 43° 07′ 30″ — 43° 00′

620 000 FEET — 890 000 FEET — 860 000 FEET — 590 000 FEET

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1966. Field checked 1968

Polyconic projection. 1927 North American datum
10,000-foot grid based on Wyoming coordinate system, west zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Where omitted, land lines have not been established

UTM GRID AND 1968 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

WYOMING
QUADRANGLE LOCATION

ROAD CLASSIFICATION
Trails

BRIDGER LAKES, WYO.
N4300—W10937.5/7.5

1968

AMS 4070 II SW—SERIES V874

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1974

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

FREMONT PEAK SOUTH QUADRANGLE
WYOMING
7.5 MINUTE SERIES (TOPOGRAPHIC)

4070 II NW (GANNETT PEAK)
4070 II NE (FREMONT PEAK NORTH)
4170 III NW (BOB LAKES)
4070 I SW (BRIDGER LAKES)
4170 II SW (ALPINE LAKE)
4069 I NW (FAYETTE LAKE)
4069 I NE (HORSESHOE LAKE)
4169 IV (BONNEVILLE)

109° 37′ 30″ — 270 000 FEET (WEST CENTRAL) — 35′ — 32′ 30″ — 650 000 FEET (WEST) — 109° 30′
43° 07′ 30″ — 43° 00′

890 000 FEET (WEST CENTRAL) — 890 000 FEET (WEST)
860 000 FEET (WEST) — 860 000 FEET (WEST CENTRAL)
630 000 FEET (WEST) — 290 000 FEET (WEST CENTRAL)

Fremont Peak
Jackson Peak
Bull Lake Glacier
Knife Point Glacier
Indian Pass
Harrower Glacier
Knife Point Mountain
Harrower Peak
Elephant Head
Mount Lester
Pole Creek
Wall Lake
Tommy Lake
Bald Mountain
Spider Lake
Angel Pass
Angel Peak
Douglas Peak
Camp Lake
Snowbridge Lake
Bull Lake Creek
The Fortress
Middle Fork
Upper Golden Lake
North Fork
Trapper Lake
Louise Lake
Louise Creek
Golden Lake
Mount Quintet
Dennis Lake
Hay Pass
Dennis
Trail Creek
Fremont Lake
Lester Pass 0.8 mi.

INDIAN PASS TRAIL (PACK)
CONTINENTAL DIVIDE
DIVIDE
FREMONT CO
SUBLETTE CO
SUBLETTE CO
FREMONT CO
WILDERNESS BOUNDARY
NATIONAL FOREST
BRIDGER NATIONAL FOREST
BRIDGER WILDERNESS
ALPINE LAKES
LAKES
TRAIL
PASS
CREEK

BT 361
BT 362
BT 363
BT 334
BT 336
BT 339
BT 329
BT 326
BT 333
BT 330
BT 340
BT 338
BT 327/335
BT 331
BT 337

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1966. Field checked 1968

Polyconic projection. 1927 North American datum
10,000-foot grids based on Wyoming coordinate system, west and west central zones
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Land lines have not been established in this area

Map photoinspected 1977
No major culture or drainage changes observed

GN MN 0°59′ 17 MILS 16° 284 MILS
UTM GRID AND 1965 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000
1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER
CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

WYOMING
QUADRANGLE LOCATION

ROAD CLASSIFICATION
Trails

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1978, 1983

FREMONT PEAK SOUTH, WYO.
N4300—W10930/7.5

1968
PHOTOINSPECTED 1977
AMS 4070 II SE—SERIES V874

UNITED STATES
DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

LIZARD HEAD PEAK QUADRANGLE
WYOMING
7.5 MINUTE SERIES (TOPOGRAPHIC)
SW/4 MOCCASIN LAKE 15' QUADRANGLE

4169 IV NE (ROBERTS MOUNTAIN)
4169 I NE (MOCCASIN LAKE)
4169 IV SE (MOUNT BONNEVILLE)
4169 I SE (DICKINSON PARK)
(BIG SANDY OPENING) 4169 III NE
(SWEETWATER GAP) 4169 II NE

109°15' 42°52'30" 109°07'30" 42°45'

730 000 FEET (WEST) 390 000 FEET (WEST CENTRAL)
800 000 FEET (WEST) 800 000 FEET (WEST CENTRAL)
760 000 FEET (WEST CENTRAL) 750 000 FEET (WEST) 770 000 FEET (WEST)

T 2 S
T. 33 N.
R 104 W R 103 W R 4 W R 3 W

WIND RIVER ROADLESS AREA
WIND RIVER INDIAN RESERVATION BOUNDARY
WASHAKIE WILDERNESS
NATIONAL PRIMITIVE AREA
SHOSHONE NATIONAL FOREST
POPO AGIE PRIMITIVE AREA
WIND RIVER RANGE
WIND RIVER INDIAN RESERVATION
TOTAL WILDERNESS FOREST
CONTINENTAL DIVIDE NATIONAL SCENIC TRAIL
FREMONT CO WYOMING
SUBLETTE CO WYOMING
LANDER RD
LANDER 26 MI.
WASHAKIE PASS 0.6 MI.

Orion Meadows
Vernal Lake
Gaylord Lake
Moss Lake
Little Moss Lake
Valentine Mountain
Valentine Peak
Footbridge BM X9973
Crow Lake
Footbridge Grave Creek
South Fork Wind River
Little Wind River
Dutch Oven Lake
Ranger Park
Valentine Lake
Little Valentine Lake
Payson Peak
Little Washakie Lake
Washakie Lake
Washakie Glacier
South Fork Lakes
Mount Chauvenet
Bears Ears Mountain
Dickinson Creek
Sand Creek
Cathedral Peak
Upper Cathedral Lake
Middle Cathedral Lake
Clover Leaf Lake
Meadowrim Lake
Smith Lake
Cook Lake
High Meadow Lake
Cliff Lake
Lizard Head Peak
Springs
Lizard Head Meadows
Papoose Lake
Papoose River
Shadow Lake
Lonesome Lake
Cirque Lake
Wolfs Head
Pingora Peak
Overhanging Tower
Sharks Nose
Black Tower
Watch Tower
Cirque of the Towers
Jackass Pass
Mitchell Peak
Arrowhead Lake
Warrior Peaks
War Bonnet Peak
Donald Creek
Big Sandy Mountain
Bunion Mtn
Cliff Lake
Cloverleaf Lake
Cook Lake
Smith Lake
High Meadow Lake
Meadowrim Lake
Papoose Lake
Lizard Head Meadows
Lonesome Lake
Shadow Lake
Little Washakie Lake
Upper Cathedral Lake
Middle Cathedral Lake
Little Moss Lake
Gaylord Lake
Vernal Lake
Dutch Oven Lake
Little Valentine Lake
South Fork Lakes
Valentine Lake
Arrowhead Lake
Cirque Lake
Mount Chauvenet
Cathedral Peak
Lizard Head Peak
Springs
Mitchell Peak
Jackass Pass
Warrior Peaks
War Bonnet Peak
Big Sandy Mountain
Bunion Mtn
Payson Peak
Pingora Peak
Overhanging Tower
Sharks Nose
Black Tower
Watch Tower
Wolfs Head
Bears Ears Mountain
Dickinson Creek
Sand Creek
Donald Creek
Papoose River
North Fork Papoose River
North Fork Lake
Footbridge Creek
Gaylord Creek
Moss Lake Creek
Little Wind River
Ranger Park
Bears Ears
Fears
Trail
Lake
Dikes
Cairn
Spring
Pipeline
Ruins
Mine
Tank
Pond
Reservoir
Corral
Fence
Gate
Bridge
Ford
Footbridge
Telephone Line
Power Line
Pass
Saddle
Ridge
Cliff
Glacier
Rock Glacier
Talus
Moraine
Swamp
Marsh
Meadow
Timber
Brush
Boundary Monument
Triangulation Station
Bench Mark
Spot Elevation
Contour
Index Contour
Depression Contour
Intermittent Stream
Perennial Stream
Intermittent Lake
Perennial Lake
Dry Lake
Wash
Rapids
Falls
Levee
Sand Area
Gravel Area
Lava Flow
Escarpment
Quarry
Gravel Pit
Mine Dump
Tailings Pond
Oil Well
Windmill
Aqueduct
Siphon
Tunnel
Canal
Ditch
Flume
Penstock
Intake
Surge Tank
Underground Conduit
Aerial Cable
Transmission Line
Pipeline
Ruins
Mine
Tank
Pond
Reservoir
Corral
Fence
Gate
Bridge
Ford
Footbridge
Telephone Line
Power Line
Pass
Saddle
Ridge
Cliff
Glacier
Rock Glacier
Talus
Moraine
Swamp
Marsh
Meadow
Timber
Brush
Boundary Monument
Triangulation Station
Bench Mark
Spot Elevation
Contour
Index Contour
Depression Contour
Intermittent Stream
Perennial Stream
Intermittent Lake
Perennial Lake
Dry Lake
Wash
Rapids
Falls
Levee
Sand Area
Gravel Area
Lava Flow
Escarpment
Quarry
Gravel Pit
Mine Dump
Tailings Pond
Oil Well
Windmill
Aqueduct
Siphon
Tunnel
Canal
Ditch
Flume
Penstock
Intake
Surge Tank
Underground Conduit
Aerial Cable
Transmission Line

BT 393

Base map prepared by the U.S. Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1974. Field checked 1976. Map edited 1981

Projection: Wyoming coordinate system, west central zone (transverse Mercator)
10,000-foot grid ticks based on Wyoming coordinate system, west central and west zones
1000-meter Universal Transverse Mercator grid, zone 12
1927 North American datum
To place on the predicted North American Datum 1983 move the projection lines 9 meters north and 57 meters east as shown by dashed corner ticks
Landnet revised according to additional Forest Service evidence.

Modification to USGS base map prepared by the Geometronics Service Center from 1980 aerial photography and 1982 correction guides furnished by Rocky Mountain Region

UTM GRID AND 1982 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
MN GN
1°14' 22 MILS
14½° 258 MILS

SCALE 1:24 000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

- National Forest Boundary
- Alienated Land within the National Forest Boundary
- TOWNSHIP AND SECTION LINE CLASSIFICATION
- Surveyed, Location Reliable
- Surveyed, Location Unreliable
- Unsurveyed, Protraction by BLM
- Primary Highway
- Secondary Highway
- Improved Light Duty
- Unimproved Dirt
- Trail
- 25 Interstate Highway
- 40 U.S. Highway
- 22 State Highway
- 1853 Forest Road
- 829 Forest Trail

SHOSHONE NATIONAL FOREST QUADRANGLE LOCATION DIAGRAM

LIZARD HEAD PEAK, WYO.
SW/4 MOCCASIN LAKE 15' QUADRANGLE
N4245–W10907.5/7.5

1981

DMA 4169 I SW–SERIES V874

● INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1981

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

ROBERTS MOUNTAIN QUADRANGLE
WYOMING
7.5 MINUTE SERIES (TOPOGRAPHIC)
NE/4 MT. BONNEVILLE 15' QUADRANGLE

4170 III SW (ALPINE LAKE)
4170 III SE (PARADISE BASIN)
4170 II SW (ST. LAWRENCE BASIN)
4169 IV NW (HALLS MOUNTAIN)
4169 I NW (WASHAKIE PARK)
4169 IV SW (RAID LAKE)
4169 I SW (LIZARD HEAD PEAK)
FORT WASHAKIE 24 MI.
BOULDER 29 MI.

109°22'30" 690 000 FEET (WEST) 20' 360 000 FEET (WEST CENTRAL) 109°15'
43°00' 57'30" 55' 42°52'30"
850 000 FEET (WEST)
810 000 FEET (WEST CENTRAL)
4761 000m N 4760 4759 4758 4757 4756 4754 4753 4752 4751 4750 4749 4749 000m N
R 5 W R 4 W
T 1 S T 2 S

Wilson Creek Lakes
Wilson Creek
Ditch Creek
Raft Lake
Wolverine Peak
Saddle Mountain
Wolf Creek
Mowo Lake
Lake Heebeecheeche
Glacier Creek
Spider Lake
Sommicant Lake
Little Wind River
Wykee Peak
Wykee Lake
Lakeys Creek
Odyssey Peak
Photo Pass
Kagevah Pass
Kagevah Peak
Lake Kagevah
Beamark Lake
Lake Solitude
Lake Polaris
Roberts Mountain
Roberts Lake
Trail Lake
Middle Fork Lake
Ice Lakes
Petroleum Peak
Darren Lake
Moraine Lake
Bailey Peak
Lee Lake
Dragon Head Peak
Pronghorn Peak
Noel Lake
Nylon Peak
Mount Lander
Sheila Lake
Bonneville Basin
Bonneville Lakes
Baptiste Lake
Musembeah Peak
Tepee Pass
Raft Creek
Grande Creek

CONTINENTAL DIVIDE TRAIL
BT 342/359
BT 348/349
BT 341
BT 344
BT 354
BT 352
BT 345

PEDIMONT CO SUBLETTE CO

Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1974. Field checked 1976. Map edited 1981

Projection: Wyoming coordinate system, west central zone (transverse Mercator)
10,000-foot grid ticks based on Wyoming coordinate system, west central and west zones
1000-meter Universal Transverse Mercator grid, zone 12
1927 North American datum
To place on the predicted North American Datum 1983 move the projection lines 10 meters north and 58 meters east as shown by dashed corner ticks

Where omitted, land lines have not been established

There may be private inholdings within the boundaries of the National or State reservations shown on this map

GN MN 15° 267 MILS 1°09' 20 MILS
UTM GRID AND 1981 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000
1 MILE 1000 0 1000 2000 3000 4000 5000 6000 7000 FEET 1 .5 0 1 KILOMETER
CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

WYOMING
QUADRANGLE LOCATION

ROAD CLASSIFICATION
Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
Interstate Route U. S. Route State Route

ROBERTS MOUNTAIN, WYO.
NE/4 MT. BONNEVILLE 15' QUADRANGLE
N4252.5–W10915/7.5

1981

DMA 4169 IV NE-SERIES V874

• INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1982

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SWEETWATER GAP QUADRANGLE
WYOMING
7.5 MINUTE SERIES (TOPOGRAPHIC)

4169 I (MOCCASIN LAKE 1:62 500)
4269 IV SW (MT. ARTER)
4169 II NW (TEMPLE PEAK)
4269 III NW (CONY MOUNTAIN)
4169 II SW (JENSEN MEADOWS)
4269 III SW (CHRISTINA LAKE)
4169 II SE (SWEETWATER NEEDLES)

109°07'30" 42°45' 760 000 FEET (WEST) 654 655000m E. 656 5' 657 658 660 2'30" 661 430 000 FEET (WEST CENTRAL) 663 109°00' 42°45'

42°30' 42'30"
40' 40'
42°37'30" 42°37'30"

720 000 FEET (WEST CENTRAL)
750 000 FEET (WEST CENTRAL)
720 000 FEET (WEST)
4734 000m N. 4733 4732 4731 4730 4729 4728 4727 4726 4725 4724 4723 4722 000m N.

BT 391
BT 392
BT 390
BT 389
BT 307
BT 306
BT 308
BT 388

Pinto Park
Deep Creek
DEEP CREEK LAKES
Shoshone Creek
Shoshone Basin
SHOSHONE TRAIL
Johnson Meadow
Upper Hudson Meadow
Three Forks Park
Agie River
Pappo
Gill Park
Middle Fork Agie River
Bills Park
Stough Creek Basin
Stough Creek Lakes
Chimney Rock
Wind River Peak
CONTINENTAL DIVIDE TRAIL
SHOSHONE NATIONAL FOREST
FREMONT CO
SUBLETTE CO
APPROXIMATE BOUNDARY
Tayo Creek
Poison Lake
Tayo Park
Coon Lake
Mountain Sheep Lake
FOREST BOUNDARY
WIND RIVER RANGE
Little Sandy Creek
Little Sandy Lake
Mt Nystrom
BRIDGER NATIONAL FOREST
Sweetwater River
Sweetwater Gap
ROARING FORK MOUNTAIN
Stough Creek Lakes
Stough Creek Basin

Mapped, edited, and published by the Geological Survey as part of the Department of the Interior program for the development of the Missouri River Basin

Control by USGS and USC&GS

Topography from aerial photographs by multiplex methods
Aerial photographs taken 1950. Field check 1953

Polyconic projection. 1927 North American datum
10,000-foot grid based on Wyoming coordinate system, west central and west zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

UTM GRID AND 1953 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
GN MN 1°19' 23 MILS 16½° 293 MILS

SCALE 1:24 000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

WYOMING
QUADRANGLE LOCATION

ROAD CLASSIFICATION
Trails

SWEETWATER GAP, WYO.
N4237.5—W10900/7.5
1953
AMS 4169 II NE—SERIES V874

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1974

400 000 FEET (WEST CENTRAL) 655 656 5' 658 660 2'30" 661 790 000 FEET (WEST) 663000m E. 109°00'

(MOUNT BONNEVILLE) 4169 IV 1:62 500

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

TEMPLE PEAK QUADRANGLE
WYOMING
7.5 MINUTE SERIES (TOPOGRAPHIC)

(MOCCASIN LAKE) 4169 I 1:62 500

109° 15′ — 644 000m E. — 370 000 FEET (WEST CENTRAL) — 646 — 12′30″ — 649 — 10′ — 651 — 750 000 FEET (WEST) — 652 — 653 — 109° 07′ 30″

42° 45′

4734 000m N.

760 000 FEET (WEST)

7 50 000 FEET (WEST CENTRAL)

720 000 FEET (WEST)

390 000 FEET (WEST CENTRAL)

42° 42′ 30″

42° 40′

42° 37′ 30″

ARROWHEAD LAKE 1 MI. (MOCCASIN LAKE 1:62 500) 4169 I

Bunion Mountain 11905

Blue Lake

Lost Creek

Big Sandy Lake 9690

Laturio Mountain 11342

North Creek

Black Jac Creek

Black Joe Lake 10258

Clear Lake 10012

Haystack Mountain 11878

Rapid Lake 10281

Schiestler Peak 11624

Big Sandy River

Diamond Lake 9485

Miller Lake 11497

Deep Lake 10502

Temple Lake 10650

East Temple Peak 12590

Wind River Peak 12538

Temple Peak 12600

Frozen Lakes 11579

Independent Mountain 11653

Crows Nest 9900

Sandy Creek

Big Sandy Campground 2 mi.

Wilderness Boundary (Indefinite)

T. 31 N.

BRIDGER NATIONAL FOREST

WILDERNESS

FREMONT CO
SUBLETTE CO

CONTINENTAL DIVIDE NATIONAL SCENIC TRAIL

SHOSHONE NATIONAL FOREST

BT 303/377

BT 301/378

BT 302

BT 304

BT 386/387

BT 305

4169 II NE (BIG SANDY OPENING)

4169 II NW (SWEETWATER GAP)

4169 II SW (JENSEN MEADOWS)

4169 II SE (SWEETWATER NEEDLES)

(LECKIE) 4169 III SE

LITTLE SANDY LAKE 0 1 MI

DUTCH JOE GUARD STA. 7.2 mi

R. 104 W.

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1968. Field checked 1969

Polyconic projection. 1927 North American datum
10,000-foot grids based on Wyoming coordinate system, west and west central zones
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Where omitted, land lines have not been established or are not shown because of insufficient data

UTM GRID AND 1969 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24000

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR WASHINGTON, D.C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

WYOMING
QUADRANGLE LOCATION

ROAD CLASSIFICATION

Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
Interstate Route
U. S. Route
State Route

TEMPLE PEAK, WYO.
N4237.5—W10907.5/7.5

1969

AMS 4169 II NW—SERIES V874

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

HALLS MOUNTAIN QUADRANGLE
WYOMING
7.5 MINUTE SERIES (TOPOGRAPHIC)
NW/4 MT. BONNEVILLE 15' QUADRANGLE

4070 II SE (FREMONT PEAK SOUTH)
4170 III SW (ALPINE LAKE)
4170 III SE (PARADISE BASIN)
4069 I NE (HORSESHOE LAKE)
4169 IV NE (ROBERTS MOUNTAIN)
4169 IV SW (RAID LAKE)
4069 I SE (SCAB CREEK)
4169 IV SE (MOUNT BONNEVILLE)

109°30″ — 109°22′30″
43°00′ — 42°52′30″
850 000 FEET (WEST CENTRAL) — 850 000 FEET (WEST)
810 000 FEET (WEST) — 810 000 FEET (WEST CENTRAL)
310 000 FEET (WEST CENTRAL) — 680 000 FEET (WEST)
660 000 FEET (WEST) — 330 000 FEET (WEST CENTRAL)
R 6 W — R 5 W
T 1 S

SHOSHONE NATIONAL FOREST
FITZPATRICK WILDERNESS
BRIDGER WILDERNESS
BRIDGER NATIONAL FOREST
WIND RIVER INDIAN RESERVATION BOUNDARY
FREMONT CO — SUBLETTE CO
SUBLETTE CO — TETON CO
CONTINENTAL DIVIDE
WIND RIVER INDIAN RESERVATION DIVIDE

BT 357
BT 355
BT 346
BT 343/350
BT 347
BT 351
BT 356
BT 353
BT 360
BT 358

Glacier Lake 10555
Mount Victor 12216
Long Lake 10683
Lake Victor 9834
North Fork Lake 9754
Medina Lake
Lake Prue 10157
Valley Lake 10147
Medina Mountain 11398
Pipestone Lakes
Howard Lake 10217
Isabella Lake 9719
Halls Butte 10467
Wilderness Lake 9627
Five Hole Lakes
Lake Siena
Lake Vera
Full Moon Lake 9567
Halls Mountain 12475
Pipe Organ 12325
Shoestring Lake 10664
Halls Lake 10602
Middle Fork Lake 10252
Rainbow Lake 10360
Sunrise Lake 10380
Stonepaint Lake 9827

Milky Lakes
Milky Creek
Bull Lake Creek
Boulder Creek
Middle Fork
Trail Creek
Canyon
Ridge
Pass
Trail
Hay Pass
Europe Trail
Highline Trail
Fremont Trail
Indian Pass Trail
Packer Trail
Hat Pass 3.6 Mi.
Kagevah Pass 1.2 Mi.
Windy Gap 3 Mi.

Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1974. Field checked 1976. Map edited 1981

Projection: Wyoming coordinate system, west zone (transverse Mercator)
10,000-foot grid ticks based on Wyoming coordinate system, west and west central zones
1000-meter Universal Transverse Mercator grid, zone 12
1927 North American datum
To place on the predicted North American Datum 1983 move the projection lines 10 meters north and 58 meters east as shown by dashed corner ticks

Where omitted, land lines have not been established

There may be private inholdings within the boundaries of the National or State reservations shown on this map

UTM GRID AND 1981 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
GN MN
1°04′ 19 MILS
15° 267 MILS

SCALE 1:24 000
1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

WYOMING
QUADRANGLE LOCATION

ROAD CLASSIFICATION
Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
Interstate Route
U. S. Route
State Route

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

HALLS MOUNTAIN, WYO.
NW/4 MT. BONNEVILLE 15' QUADRANGLE
N4252.5—W10922.5/7.5

1981

DMA 4169 IV NW—SERIES V874

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1982

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

DOWNS MOUNTAIN QUADRANGLE
WYOMING
7.5 MINUTE SERIES (TOPOGRAPHIC)

4070 IV NE (UNION PEAK)
4070 I NW (SIMPSON LAKE)
4070 I NE (TORREY LAKE)
4070 IV SE (GREEN RIVER LAKES)
4070 I SW (INK WELLS)
(SQUARETOP MOUNTAIN) 4070 III NE
(GANNETT PEAK) 4070 II NW
(FREMONT PEAK NORTH) 4070 II NE

109° 45′ — 590 000 FEET (WEST) — 42′30″ — 40′ — 260 000 FEET (WEST CENTRAL) — 109° 37′30″
43° 22′30″ — 43° 15′ — 20′ — 17′30″

980 000 FEET (WEST) — 980 000 FEET (WEST CENTRAL)
950 000 FEET (WEST CENTRAL) — 950 000 FEET (WEST)
240 000 FEET (WEST CENTRAL) — 620 000 FEET (WEST)

BT 367
BT 372
BT 369/370
BT 368
BT 371

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1966. Field checked 1968

Polyconic projection. 1927 North American Datum
10,000-foot grids based on Wyoming coordinate system, west central and west zones
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Land lines have not been established in this area

To place on the predicted North American Datum 1983 move the projection lines 10 meters north and 59 meters east as shown by dashed corner ticks

Map photoinspected 1978

No major culture or drainages observed

UTM GRID AND 1968 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
GN MN
0°54′ 16 MILS — 16° 284 MILS

SCALE 1:24 000
1 MILE
1000 FEET
1 KILOMETER

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

WYOMING
QUADRANGLE LOCATION

ROAD CLASSIFICATION
No roads or trails in this area

DOWNS MOUNTAIN, WYO.
43109-C6-TF-024

1968

DMA 4070 I SW-SERIES V874
PHOTOINSPECTED 1978

INTERIOR-GEOLOGICAL SURVEY, RESTON, VIRGINIA-1987

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

HORSESHOE LAKE QUADRANGLE
WYOMING—SUBLETTE CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

BT 332

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1968

Polyconic projection. 1927 North American datum
10,000-foot grid based on Wyoming coordinate system, west zone
1000-metre Universal Transverse Mercator grid ticks, zone 12, shown in blue

Where omitted, land lines have not been established

UTM GRID AND 1968 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
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A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

ROAD CLASSIFICATION

Primary highway, hard surface
Light-duty road, hard or improved surface
Secondary highway, hard surface
Unimproved road
Interstate Route
U. S. Route
State Route

HORSESHOE LAKE, WYO.
N4252.5—W10930/7.5

1968

AMS 4069 I NE—SERIES V874